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# Supreme Court of the United States

**OCTOBER TERM, 1935**

IN EQUITY.

# No. 11, Original

THE STATE OF WASHINGTON, COMPLAINANT,

*vs.*

THE STATE OF OREGON.

NARRATIVE OF TESTIMONY PREPARED BY THE STATE OF WASHINGTON.

FILED OCTOBER 14, 1935.

No. 17 ORIGINAL

IN THE

# SUPREME COURT

OF THE

UNITED STATES

OCTOBER TERM, 1930

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

# BRIEF FOR THE STATE OF WASHINGTON

## NARRATION OF TESTIMONY

BEFORE HON. WILLIAM W. RAY, SPECIAL MASTER.

STATE PRINTING PLANT, OLYMPIA, WASH.

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## WITNESSES

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2. List of names of witnesses whose testimony is not narrated is set out in this brief immediately following the index.

## EXHIBITS

3. List of all exhibits received in evidence is set out in this brief beginning at page 251.

4. Statements of objection to introduction of exhibits in evidence are set out in this brief beginning at page 254.

## TESTIMONY NOT NARRATED

List of names of witnesses whose testimony is not narrated in this brief. These are all witnesses for the State of Oregon. Numerals in parentheses refer to pages of reporter's transcript where the testimony is found.

Babcock, D. H. (812-819); Bookout, Lloyd (837); Bowman, Orin (510-516); Criger, W. E. O. (702-712); Eiffert, Charles (822-831); Fee, James A. (630-634); Harris, Clifford B. (841-845); Herman, W. H. P. (846-850); Herr, C. E. (748-756); Karker, C. J. (805-811); Knopf, George (742); Schwald, Chas. (584-592); Whiting, H. V. (582).

## TESTIMONY

Submitted in pages herein following is the substance of testimony deemed material to the contentions of the Complainant in the instant case. Numerals in parentheses in the narration of testimony refer to the page of the reporter's transcript where the testimony begins.

MARVIN CHASE, whose qualifications were admitted, testified in behalf of the State of Washington, on direct examination, for the purpose of qualifying Washington's Exhibits Nos. 20 to 23 inclusive, for admission in evidence (17-51, 148):

My name is Marvin Chase, a resident of the State of Washington. I have had over fifty years practical experience as an engineer. I have examined Mr. Youngs' soil map (Washington Exhibit No. 15) and have endeavored to estimate the acreages of the various irrigated areas classified in that map to type of soil, having in mind also the rights which are set out in the various decrees of the water rights in the two states, which decrees are in evidence in this hearing at this time. I have made a tabulation of those acreages. One tabulation is by sections (Washington Exhibit No. 20), that is, I have located as best I could the areas of the different classifications of soil shown on this map according to township, section and range in the State of Washington. I have also done the same thing for the State of Oregon (Washington Exhibit No. 21). In addition I have also estimated the areas of these lands according to the soil classification of this map by the priorities of rights shown in the several decrees for the area in the State of Washington (Washington Exhibit No. 22) and also the area in the State of Ore-

gon (Washington Exhibit No. 23). I have included only the lands that are what we have termed related lands, lands that are related to each other on this stream system so far as the water rights are concerned. I arrived at the estimates of these acreages by perimetering the area shown on the map.

(148) On cross-examination by Mr. Cochran, counsel for the State of Oregon, Mr. Chase testified: In making the tabulation of acreages as shown in Exhibit 23, I used the soil map Exhibit 15 together with the Oregon decree and permits. In the west half of the southwest of the northwest of Section 21, Township 5 North, Range 36 on the soil map, there are indicated two classes of soil, types 2 B and 1. In my tabulation of priorities for Oregon Exhibit 23 under date of 1872 I class 3½ acres as 2 B. I distinguished as to where that particular priority would apply under those two classifications in this way. I first made a transparent section map, cut up into smaller legal subdivisions than what the map is, into sixteenths, and then placed it over this map here, and with the aid of people, or one or two who were familiar with the location of that particular piece of land, we in that way found as near as possible where that particular tract was.

Washington Exhibit No. 1, the Oregon decree, page 112, under the name of Leslie Demaris, Proof 162, combines 1872 as 3½ acres, 1890 as 6½ acres, 1906 as 9½ acres into one so that they can use all of those priorities upon the same land. Consequently when you segregate one priority for one particular piece of soil, picking out the very small areas as this area is, it would be the best

average that would be possible to get, of those small tracts. On larger tracts it comes nearer being absolutely accurate, as near accurate as possible to fit the map to the ground on irregular areas. There isn't any way that I can tell which type of soil comes under any particular priority except to know the land. On these particular lands, I have been over them many times. As to just where they lie exactly I do not know, and I doubt if anyone does. It is impossible to make a hundred per cent soil classification of the lands on the ground. There are only three types of the six or seven given on the map, in this particular section. I gave the early priority '872 as a 2B classification. Under 1890 it gives it here as 3½ acres and ten acres is shown. In both of these cases the amount of land taken from his ownership with the priority dates are divided as nearly as is possible between the two. Under 1890 I gave the 6½ acres as Class 3. I believe there is Class 3 in that particular part. Here is Class 3. It goes up into the Northwest of the Northwest. I have classified, under 1906, 9½ acres as Class 3 in the same section. It would be an average, which is all that is possible to get. My method of determining that was to make an average and distribute it between the three priorities which that man had upon that particular land. With the soil map as the one which we used, together with a knowledge of the land, it was done as near accurate as it could possibly be with those irregular tracts and the irregular way in which the soil classification is made there. Here is a piece of land having three priorities and two classifications (of soil). In place of dividing one priority between the two classifications, I put all of one classification

under one priority and then another classification under another. The older priorities along the stream were given the better type of soil, where it was impossible to distinguish from them owing to the fact that it is usual for one to develop the better land first. With a proper regulation and proper use of water, the beneficial use of it would be less on the better type of soil than on the other. If it was so shown on the map, as near as I could determine it, I gave to the older priorities the type of soil that would take the least amount of water under a beneficial use.

At this place, Mr. Cochran, in answer to a question of the Special Master, stated that at the time of the rendition of the Oregon decree, the Court did not give any consideration to soil classification in determining priorities.

Continuing, the witness testified: We used the same system throughout. We used the same system in dividing the five classes of soil, Type 1, 1D, 2A, 2B and 3 in the A. L. Demaris land in the East Half of the Northwest Quarter of Section 21-5-36, between the four priorities of 1868, 1893, 1901 and 1908 in Proof No. 156, on page 112 of Exhibit 1.

You have called my attention to Proof 259 and 261, page 126, of Exhibit 1 (The Oregon Decree) under the name of H. R. Graham. The dates of priority are 1871, 1890, 1891, 1895 and 1904. The land is described as eighteen acres in the Southeast (quarter) of the Southeast (quarter) in Section 35-6-35 (which contains) soil types 2B and 3. You ask why I left 2B out of my tabulation (Exhibit 23). I think the location of the irri-

gated area of that particular piece of land is not in the 2B section of that forty-acre tract but is over to the side of it in (type) 3.

In tabulating the Southeast (quarter) of the Northeast (quarter) of Section 3-5-35, Proof 915, page 197 of Exhibit 1 under the name of H. E. Winn with the dates 1881, 1894 and 1896, I have tabulated the land as 2B and 3 leaving out 2A and 1R. I think you will find 2A is quite a ways from that land; it lays right in here, in 3 and 2B. In making that calculation, however, I have no knowledge of what water from any particular priority was used upon the 2B land. I classified it by putting the best land under the old right. The use of water up there as to the priorities is impossible to tell. I don't think there is any segregation up there at all; I can find none. The same is true with all the area so far as there is any place where more than one priority is used by a person upon more than one type of land. It is impossible to tell the priorities.

At this point the following may be noted:

THE SPECIAL MASTER: I assume, Mr. Cochran, that Mr. Cunningham's purpose in these exhibits—and I may be in error—was to take the priorities and then with the land classifications deduce the necessities under the priorities?

MR. CUNNINGHAM: Well, not quite that strong. If I may make the statement at this time, we have a soil map which attempts to designate certain types of soil and indicates them on the map.

Now, this witness took the decrees and permits and as best he could, applying what information he had—

THE WITNESS: Together with that map.

MR. CUNNINGHAM: —using his knowledge of the land and other data that was available he attempted to estimate the amount of irrigated lands in each classification according to the priorities set out in the decrees and the permits. We do not claim that it is accurate. We merely claim that it is an estimate that approaches possibly as near an accurate situation as the map is supposed to represent.

THE SPECIAL MASTER: Well, is it an analysis of the datum upon the map, or is it introduced for the purpose of controverting the datum upon the map?

MR. CUNNINGHAM: It is merely illustrative of the datum on the map.

MR. COCHRAN: In that regard, our cross-examination was designed merely to show and reflect the true picture of how that data was organized, and that it is impossible to make a real estimate.

MR. CUNNINGHAM: We will admit that.

THE SPECIAL MASTER: An examination of the exhibits will likely clear up the question in the court's mind anyway.

MR. CUNNINGHAM: While we are on this point, on yesterday I gave a statement to the court about the scope of the stipulation with respect to this Young's map, and I was in error at that time; if I may be permitted, I will read just the part of the stipulation covering this map.

(Reads from Stipulation No. 4)

MR. COCHRAN: We do not deny the section or the type of soil, but simply the present exhibit, and by reason

of the fact it is impossible to arrive at a correct acreage distribution according to priorities, we move to strike out the Exhibit 23, I think it is, which is the tabulation by priorities.

THE SPECIAL MASTER: The motion will be noted and ruled upon after examination.

MR. CUNNINGHAM: For the purpose of the record I should want it understood that any statement made by counsel for the State of Washington on yesterday or any stipulation in open court made on yesterday inconsistent with the written stipulation No. 4 shall be considered as modified or as withdrawn, so far as the written stipulation is concerned.

THE SPECIAL MASTER: It may be so considered.

MR. COCHRAN: That is satisfactory.

(51) MARVIN CHASE, recalled as witness for the State of Washington, testified: I am the witness who testified a moment ago. As a hydraulic engineer, I made an examination of the stream system of the Walla Walla River in Washington and Oregon, with the idea of giving some of the general physical characteristics of this stream, and the manner in which the water is used by the people of Oregon and of Washington. I reside at Wenatchee, Washington. I was a member of the Washington State Water Code Commission from the year 1911 to 1917 when our State Water Code was enacted. I was State Hydraulic Engineer of Washington from the year 1917 to 1924. I was also chairman of the Washington State Columbia Basin Survey Commission from the year 1919 to 1923. I am a member of the American Society of Civil Engineers and for more than fifty-one years have

been continuously engaged in hydraulic work in Nebraska, Colorado, Montana, Wyoming, Idaho, Washington, California and the Republic of Mexico.

The Walla Walla River is not different or distinguishable from the other mountain streams which we take water from. The water supply comes from snow in the winter months in the Blue mountains. The water shed is timbered and has a heavy growth of grass naturally. On the major portion of the stream, it has a gradient of from 60 to a 100 or 200 feet to the mile. It steepens as it goes toward the mountains. There are deposits of river wash along the course of the stream, made up of rock and silt washed from the stream. It forms small deltas along the way, the largest one is at the outlet of the canyon near Freewater. In a stream of this character where the gradient is steep, there are many channels used during high water which are more or less dry during the low water. If water is carried in these for any considerable distance, it is a very wasteful method of diverting water from a stream for irrigation. The use of water for irrigation is detrimental to the lower reaches of the stream. Along the major portion of the Walla Walla River, some water returns from the irrigated land to the stream but in no instance is there as large an amount as what is taken out of the stream, and in no instance does it return to the stream in the later months in time to be of benefit to the lower users on the stream. Excess diversion in the upper reaches, is a very decided loss to the supply of the stream. In the upper reaches of the Walla Walla River, there is fairly generally a wasteful use and a wasteful way of diverting the water. It is wasteful in the excessive amount which is diverted and placed on the land, in

the method of diversion, the long by-channels or by-passes made, in the lack of diversion or controlling works and of measuring devices, and in the over-diversion of the amount necessary, allowing the surplus to flow down unused sloughs or channels, oftentimes dry, without returning it to the stream. I am speaking now of the territory from the town of Milton, including both forks of the stream, up to its source so far as irrigation is practiced along the stream. There is both an over-diversion and a wasteful method of diversion along the stream. By over-diversion, I mean that there is an amount diverted in a ditch in excess of that which can be beneficially used on the land or of that which is set out in their permit or decree. In this reach of the stream above Milton, there are very few ditches that have at this time any diversion works, and in nearly every instance, they are of a temporary and of a make-shift character. When I speak of highwater channels for the diversion of water, I mean that there is a brush and rock barrier placed in the stream later in the season when they wish to divert their water, and the water is turned into an old channel for considerable distance and lower down some headgate, diversion work or control is put into their ditch. In nearly every instance an excess amount of water is turned from the river into the particular dry channel or slough, and the excess part where there is a regulation or control, is merely turned on down the slough or only in a very few instances is it returned directly to the stream. That method of diversion results in an excessive transportation loss in this dry or high-water channel and also depletes the stream system proper. It increases the weathered area of the stream to a great extent and therefore

adds to the transportation and evaporation loss. People want to use an excessive amount of water because it makes it unnecessary for them to perform as much labor in the diverting and controlling of their water and in the irrigating of their land. They make the excessive use of water do the service of the cost of labor and material. It would not be an excessive expense for these landowners up there to put in diversion works. They could use the material at hand, which consists of logs and rocks and put in diversion works as lasting as those that might be constructed in a more expensive way. The diversions in that part of the stream are mostly of individual landowners or the copartnership of a few. They are all comparatively small, I think, running probably up from only a part of a cubic foot per second of time to 14 or 15 c. f. s.

This delta formation along the river in the territory around Milton-Freewater, just below the canyon is hydraulically made from the rock and silt which has come down the stream. There is very little sand. There is no deposit of sand on the water shed; it is a basalt formation with heavy basalt clay or heavy loam clay on the surface of nearly all of the shed, and what soil comes down the stream is of a loam or clay nature. There are considerable amounts of rock and boulders in this formation and some local sand which has been manufactured on the way down.

As to the method of diversion in the Milton-Freewater country, I can describe the physical conditions surrounding the method used by the Milton ditch. The water each season is diverted into a channel, probably an old river channel; I think they probably put in their diversion works annually, because last year all the diversions

works they had there were of a temporary nature. And at this time they have a diversion there made of brush and rock and old pieces of automobile diverting the water from the main stream into this channel, carrying it down a distance of about three hundred feet, at which point there is an intake to a pipe line and a waste-way put across the channel allowing the excess water to flow down this channel for a distance of about four or five hundred feet, making a total distance of by-pass or channel of quite a thousand feet.

From that point it passes from the pipe line for one hundred or so feet long, and then it is constructed in an open earthen channel for a distance of probably a quarter of a mile, after which time it is returned to another former channel or slough, being picked up again down in the city of Milton, and at that point or about a mile from the point where it is diverted from the Walla Walla river there is a measuring device, but between the weir where the water is measured and the river there are a number of diversions taken off before the water is measured. There are no diversion works at the river at all. The channel about 300 feet long before the pipe line is used, which I spoke of, is part of an old river channel part of the thousand feet of channel which is used part as a head ditch or ditch bringing the water to their diversions and the balance of it is used to carry the water which is in excess of their diversion, back to the main stream.

There is an excess of water at the tail or outlet end of the Milton ditch so that another ditch company has its right based on the waste or excess water which they divert. There is practically 700 acres using so-called waste water in the Milton-Freewater territory. The

waste water, I should judge, is beneficially applied. I find the same general crops, the same character of orchards in the territory beyond the tail of the Milton ditch as grown on the rights from the river. The manner of use and type of diversion shown by the Milton ditch leads to a waste of water. It reduces the supply of the main stream particularly in the hot months of the summer when the larger amount of water is required for irrigation purposes, consumptive use. It is an injury to the stream system below the Oregon line.

I recall the ditch known as the Zell ditch. It is my recollection that there is an artificial ditch where the water that is spilled over from the controlling works of that diversion is returned to the stream.

In speaking of controlling works, I do not include divisional weirs. Controlling works would necessarily have to have a measuring device to enable the regulatory authorities or the water master to rightfully apportion the water of the stream to the various users.

On cross-examination, Mr. Chase testified in part:

The territory irrigated above the town of Milton is narrow in places; other places it is fairly wide, probably not over three-quarters of a mile wide at the widest point. It is irrigated in narrow strips along the creek above the forks on either side but there are some fairly good fields. I would say it was different from a narrow canyon.

The soil formation up that canyon is of the cobblestone or boulder type with fine silt filled in with small rock which is broken off the hills or has come on down the stream, mostly of an angular shape type. The general thickness of the soil on top of this gravel or boulder

formation varies. Some places on bars it lays very thin, other places it is quite deep, going down to a depth of eight or ten feet or maybe deeper. I haven't dug any test pits, but going along the stream, the stream has cut into a good many banks where it shows fairly solid soil down to that depth. How much soil there is in those bars where the rock shows up more plainly on top I don't know. The soil, you will find, probably would run down in that to some depth.

The character of the stream, a grade from 60 to 200 feet to the mile, renders the stream very swift. I do not know what the grade is above Milton to the forks, except to estimate it over the whole distance. I do not think it is an average of 90 feet to the mile. Without looking at the hydrographic data, I wouldn't be able to state what the maximum flow of the river is. I have been more concerned with the minimum flow than I have with the maximum. I have observed that the current is so swift that the stream changes its position. It isn't different than most streams of that gradient. Trees and other debris changes it in places and other times it comes back to old places. It is just a changing channel.

Assuming a gradient of 80 feet to the mile and with a current of 1200 second-feet of water coming down, the ordinary log and brush dam that the farmer will put in, will hold that current if properly constructed. It would not cause the river to wash out a channel at a different place, if properly constructed. A dam to hold that kind of current on that kind of grade would not require a cement foundation. There are two methods on streams of that type. You can construct a low dam entirely across the stream, of log cribs and rock, with

the proper abutments to it, allow the whole stream to go across it, or you can construct a lower dam and use a type of flash-boards on it, which you can take off during the high water period. Either type will be very lasting. Most of those farmers up the stream, who dig out individual ditches, irrigate fairly small acreages but I think they would have the financial ability to construct a low dam to hold the current and power that that river assumes. If I were a farmer there that is what I would do. I have observed that the concrete dam and diversion works made from the Tum-a-lum into the Little Walla Walla was partly torn off by the force of the stream there. I think the one down at the Hudson Bay is as solid across the stream as when it was built.

Those old channels (used) in the diversion of water up the stream have a cobblestone or boulder formation and in a measure a few of them have rather silted up with some soil and for others they make a new place every year. If the water comes in too close to their former diversion and takes it out, they dam the water up again against the gravel bank.

I believe that the proper method would be for them to take out ditches in place of using the old channel or if they took the (water) down a channel a ways to their headgate, at that point (they) should return the undiverted water to the stream. The old channel at the head of most of those ditches is washed every year. A ditch would have the same propensity. In any instance it will be necessary for them to dam up the stream some or else go quite a distance above to get a gradient to bring the water into their ditch. With a fall of 80 feet to

the mile, there wouldn't be so much distance to go, (yet) it is evidently true that it is a greater distance than the farmer wants to go, from the fact that he puts in a crib in many instances out into the stream, and, of course, which the high water takes out, just a temporary crib made up of willows and brush and rock and other things in a temporary way. In fact, all of them along the stream appeared to be, even as large as the larger ones, as a very temporary way of diversion of water from the stream. There would not be an annual expense in a ditch from the dry channel to the original channel. If they had the same ditch, the same one back to the stream would be there for all time. If the stream changed its position by reason of a torrent in high water time, to wash out their canal or ditch down to the point where the water was returned to the stream, then, of course, there would be expense, but in very few instances, if any, does (the high water) reach down their ditch.

I [illegible]nly made an intensive study of this stream for the past 2 years and this far in 1934, although it is a condition that we have to study and have studied for all time along all streams. I did not make any study of the return flow to the stream up there. I don't know exactly what you mean by return flow. How do you distinguish between the unused part of the water which has been diverted from the river, put onto the land, and returned to the stream, and the water that naturally gathers along the stream. In other words, the stream channel gathers the water from the watershed, and it gathers all the way down so far as there is any water to gather from the sides. Instead of return flow it is

the water that is being gathered. It is not possible in the study of the stream flow to distinguish between the water that is naturally gathered by the stream and such water as may be returned to the stream from irrigation. The only way in which I could answer that question is to give you my experience on streams which, because of the excess use along these streams for years and the denuding of the watershed along the streams and the farming of the land, it has resulted in the lower rights on the streams, with streams of about the gradients the Walla Walla River has, of being short of water or the rights destroyed entirely, and on those streams that I know of or had experience on that so-called excessive use of water along the stream has not been beneficial, in fact has been detrimental to the orderly way in which the water comes down the stream, and especially during the drier months that the water is used for irrigation. In my study of that stream above Milton, I do not know whether or not any of the water diverted comes back into the stream. I cannot differentiate between the natural water that is gathered and that which is put onto the land. When I say that the excess water is wasted, I know it has been wasted to the extent to which it has increased the wetted area and (of) the exposure to evaporation and other consumptive losses. I did not make any study to determine what the loss would be from evaporation and excess seepage.

I haven't examined the diversion works in Washington lately. At the time I examined them, the diversion works upon Mill Creek and Yellowhawk were different from the very few diversion works along the Walla Walla River above Milton. Some of them (upon

Mill Creek and Yellowhawk) were concrete; some were of one type and some another; they all have controlling works or measuring devices. I know at this time of no measuring devices along the Walla Walla River above Milton.

In the part of the stream above Milton, I would judge the drainage ordinarily is to the river. The drainage is not entirely to the river on the surface; sometimes the land lies back the other way, just as it has been formed by the stream at other times. I have not examined the Tum-a-lum. I am not qualified to answer the question whether during the time I have known the stream from 1917 to the present time, during the hot months of the year, July and August, there has never been any water come down the full length of the Tum-a-lum. I have seen it dry.

The lands alongside the stream bed itself are in trees or brush at this time, or being farmed and have a great deal of very fine soil and some clay soil in it. In no instance is it sandy soil. The channel of the stream from Milton to the fork is all covered with rocks, owing to the velocity of the stream it leaves no soil in sight. That same condition of the river channel exists below Milton to the state line almost.

Since I first knew the stream there has been development along the river. There has been no installation of measuring devices and diversion boxes on the Walla Walla River itself except the diversion work down at the head of the Hudson Bay and the one now building (for the Little Walla Walla).

From my investigation I did not learn when the Finis ditch was built. In reading the decree and the other papers in connection with it, it is my recollection, that the suit was started about 1906 before the enactment of the Oregon Water Code and the determination of it was about 1912 when the decree was entered.

W. I GERMAN, for the State of Washington, testified in part (58-65):

I live on a farm near the Pepper's Crossing bridge, south and west of town. The Walla Walla River runs through it. The Oregon-Washington state line is its south boundary. It is about 1½ miles east up the river from the Milton-Walla Walla state highway. I have lived in Walla Walla County 26 years, most of the time in the Walla Walla River valley. In October, 1924, I moved to the Duran place about a half mile farther down the river and lived there until the fall of 1930 when I moved to my present place and have lived there since. We raised alfalfa, wheat, pasture and had some dairy business, on the Duran place. We raised wheat on the land opposite the river from where the buildings were. We crossed the river back and forth with teams and equipment to farm the part across the river. There was a pretty good supply of water in the river during July and August the first year I occupied this place, as I remember it. The stream banks of the river where we forded were 60 to 70 feet wide I should judge. The stream of running water was probably 20 feet wide, and a foot and a half deep in the middle of the stream in July and August. There was not very much difference in the supply between the (two) months. Since 1925

the supply of the stream has been gradually lessening in amount during the summer months. The supply of the stream opposite the place where I now live goes very low during the summer. It would be hard to estimate the drop in it but it is very much different during the summer months from what it was in 1930. I would say that the supply of this stream in that vicinity during the time I have been acquainted with it has generally been growing smaller.

The year 1931 was an extremely dry year all over. In '31 I was farming a piece of land further up the river and the spring up there that had not been dry for 40 years, went dry that year. I had greatest loss on account of the shortage of water in 1929. (It) was a very dry year, too. I suppose 1925 was an extraordinarily wet season. I found '29, '30 and '31 three very dry years. I know during '29 and '30 we didn't get much water. I have not been irrigating since 1930. I did not particularly pay any attention to irrigation conditions during '31, '32 and '33 only as I would cross back and forth across the river. I had no knowledge of what the diversions by my neighbors above me were at all. As I remember it, the rainfall wasn't as good in 1933 as it had been some years, other years. The river was extremely low all summer, that is, for the level that we usually expect there, but whether it further up was diverted or not, I couldn't say just why that was. I made no measurements at any time. As I say, it was more—my observation was more from crossing back and forth, it was either high or it was low, or extremely low. I made no bench marks of the place where the water stood at pre-

vious years, I just took it from my recollection. During the past few years in my neghborhood, the irrigated land has not been increased. I did not increase it upon my land.

J. C. HAMMER, for the State of Washington, testified in part (67-78):

I live on 17.69 acres bordered on the south by the Washington-Oregon state line and situated in Washington about a quarter of a mile west of the Milton-Walla Walla state highway. The East Little Walla Walla runs through my place. It has a water right from the East Little Walla Walla River with a priority of 1891. I purchased and took possession of this property in January, 1919, and I have lived on the place ever since. The East Little Walla Walla River as it passes through my property is about 14 feet wide between banks. There was an abundant supply of water there when I took the place. In 1919, during July and August, I would judge, in the middle of the stream (the water) was about 12 inches deep, something like that. In the past few years during the summer months it has been diminishing. It became noticeable along about 1921. There has been a very pronounced deficiency of water in the past 6 years; '21 was when it started to diminish, then possibly about 4 years ago it diminished very fast. During the last 2 or 3 years during the summer months (there has been) very little water there. I raise prunes, apples and alfalfa hay. During the first 3 or 4 years I was on the place, it was practically all in fruit, prunes and apples. I have removed 350 prune trees and throwed that into alfalfa, the trees in the lower part, where it is gravelly, where I couldn't get water for the lack of water, I pulled them

out; they died. Lack of water has been the chief cause for changing to the form of crop I now raise. I have had to change the character of my farming from fruit raising to mixed farming and raising more stock. I couldn't get the water to that end of my place to save my life; I didn't have enough of it. The water supply is sufficient up to July 1st; then is when it begins to diminish and goes down, and after that I get very little. I had oceans of water in 1919; we had plenty of water in the year 1920, too; then in 1921 it began to diminish. The water master went upon my branch to distribute water in 1931 or '32. I pulled out the trees 6 or 8 years ago. I cut the trees down on the gravelly land as they died. They began dying along about 1922. They did not die from disease. I didn't examine them for wood borer. I knew what was wrong with them. I set them out in 1921. When I took over the place, this gravelly spot was just bare ground. There had been alfalfa in it before, but that was run out.

The Hoffman ditch diverts no water from the East Little Walla Walla. It is from the Spring Branch. The Ross-Chapman ditch comes out just below the state line on the north side of the road. I wouldn't think it would take all the flow because it don't get down there; there is a dam on the Oregon side which is the last dam in Oregon; they dam it off with sacks; what goes through we get, what don't go through, we don't get. I have no knowledge as to whether that Ross-Chapman ditch is ahead of my land or not. I haven't ever investigated to find out whether the man immediately above me has a prior right.

During July and August, 1932, the East Little Walla Walla had a small flow of water across the state line. My well, they tell me, is 18 feet deep. But you dig down at the edge of the ditch four feet and your soil would be perfectly dry. (My well) is a drove well; I couldn't tell you how far it is to the water level there. The underground water rises on my land only in one place, where there is a gully and that is only during the fore part of the season and that don't occur every year. During the time that my trees went dry, we got a stream about 4 inches deep and about 12 inches wide upon the place. I divert the water into a flume immediately and then take it across a gully. The grade of the flume is about a quarter of an inch to the rod. It is almost on a level.

CARL ROSS, for the State of Washington, testified in part (82-91):

I live on property that at one time belonged to my father's and mother's estate. The East Little Walla Walla goes through the place but I am on the back side —my share of it is back just off the creek. The place is located about a half mile west of the Milton-Walla Walla state highway and about a half mile north of the state line. I have lived there practically all my life to date. My brother and two sisters have occupied this place and for a number of years (it) was farmed as one place. Later (it) was divided among the children.

The Big Spring Branch joins the East Little Walla Walla on the place that belonged to this estate, about 200 yards above the buildings of the old homestead. It now belongs to my brother, Royal Ross. The elevation

of the surrounding land where the buildings of the homestead are is about 2½ feet above the stream. We used to have a small power plant located at the back of the home on the banks of the East Little Walla Walla for lights and for power. We generated electricity there by means of a water wheel. The water was diverted out of the Big Spring Branch about 300 yards above by means of a flume down to the water wheel. I couldn't say exactly when we built the power plant. It must have been about 25 years ago. It has been many years ago anyway. We run it at night and in the day time when we needed the power, used it for washing machines, churns, electric lights and so on. We continued to operate the plant up till '26 or '27. A long time ago we had lots of water, then it got so we didn't have enough, couldn't run the plant at all. In the summer time it just completely stopped. We first noticed the amount of water decreasing round '24 or '25. Where we used to have all the lights we wanted, it got down to where we had only one or two lights. I couldn't say exactly when we discontinued the plant. It must have been in '26. There used to be lots of water run in the Big Spring Branch all summer long until the last few years. We noticed the decrease in the summer flow around '25. It went down some before that in '21, '22, '23, along in there but not much. The last few years the East Little Walla Walla above the place where the Big Spring Branch joins it, went dry. That condition has existed about 4 or 5 years. There used to be a good stream running through there. We used to fish in it and go swimming in it, had a little boat I ran on it from our old homestead up the creek about half a mile. The supply has (gone) down the last

6 or 7 years. It goes steady when it goes, but then all at once it just drops, you ain't got anything. It is just completely dry down there now. I had fruit on the part of the place I own but I pulled it all out. I pulled the last out in 1930. I haven't been able to irrigate my place during the last 3 or 4 years—haven't got no water at all. I quit it. There's no water in the ditch in the summer time. I haven't even got stock water. I have been raising some corn and some potatoes—I started some alfalfa. My brother, my sisters and I have changed the farming there in the last 5 or 6 years from orchard to others. Pulled out the orchards and been raising corn and potatoes, and some stock. Some of this change has been through lack of water and some of it is because the fruit wasn't paying. We used to irrigate and we had the water to irrigate with. Six or seven years ago was the last time I irrigated any part of the place. It was about the same with my brother's place, I guess. I have pretty heavy soil. It is adapted to fruit raising if I had the water.

I have been acquainted with the main stream over by the McCoy Bridge and below. I was over there very often during my early days. I used to go swimming there. I had friends over in that part of the country I used to visit. Mr. Heidenrich, a blacksmith, used to shoe our horses for a number of years. I had occasion to observe the general supply of water in that river as I crossed. Fifteen or twenty years ago there was quite a bit of water came down there; that is, not as much as it does run in the spring, but there was a good stream of water run there all summer, that is down below there, but now it goes clear dry, along in by the McCoy Bridge.

I never (swam) up that far. We had big swimming holes down closer to us there. The water was about 15 feet deep. You can't hardly find a swimming hole now big enough to go swimming in. They filled up with gravel. Several cloudbursts up the main stream brought down a great deal of sediment and those swimming holes filled up with that sediment to a certain extent. I am not very well acquainted with the stream above the McCoy Bridge.

There are no springs on my place. I think we could get water in about 7 or 8 feet, if we dug a well. There is no gravel in my soil. Over in the river bed there it is mostly all gravel. My place is not generally considered underlaid with gravel. It is a very deep soil. I have an 1892 water right for 5 acres and an 1891 right for 10 acres from the (East Little Wall Walla). We get our (water) right on the state line. Ours is the first diversion after the water crosses the line. The Water Master started measuring the water 3 or 4 years ago. He has been distributing to me what there was to distribute since that time. I get my water from the Ross-Chapman ditch out of the East Little Walla Walla (called in Washington Exhibit 11, East Spring Branch). I don't take any water out of the Big Spring Branch for irrigation. The only water that we used from the Big Spring Branch was for the power plant when the place was all together. The place was divided up three years ago, I believe.

It was about 3 feet across the water wheel. It was an undershot. Then we took that out and put in a turbine about 1912 or '13. I don't know what size it was. I don't remember the size of the generator and how much power it took. We used the generator over twenty years. At

one time we could use 15 or 20 lights. We had about 3 or 3½ foot fall. Beginning about 1925 the water supply went down—it was rather a sudden change — so we couldn't use (the power plant) any more.

ROYAL ROSS, for the State of Washington, testified in part (100-106, 422):

I live near the place described by my brother, Carl Ross, a moment ago. I have lived on my parents' place, now my place, for 41 years. There wasn't much change in the supply of water in the Big Spring Branch until about 7 or 8 years ago, when we commenced to notice a change in the creek, going down some. We noticed a change in the amount of water that was available for the power plant more than anything else, I suppose on account of the lights. From 1920 to '26 or '27 is when we noticed the worst change in our light plant. There was a gradual change from year to year. I would say about '21 or '22 there was the most change of any time, and then it gradually got worse each year until the last 2 years we had the plant, we had very little light or none at all scarcely, maybe one light or two lights. I don't recall the year we put the plant in. I believe it was about 1905. We ran it until '27 or '28.

The change in the supply of water in the East Little Walla Walla above where the Big Spring Branch joins it has been more noticeable in that creek that it has in the Big Spring Branch. In the last 9 or 10 years, it started out with a small change, kept going down each year; I would say along about 6 or 7 years ago there was an awful large change in the creek—went down over night, it seemed like, when the dry season came on—over night

it went down like it had been taken out above, you know, and dropped maybe 6 inches over night; the rest of the season it would be very low. The last 2 or 3 years there has been scarcely any running water in it at all. There wasn't any water in it last year; it was practically dry.

I went over to the main stream by the McCoy Bridge occasionally. I occasionally went over there to the blacksmith's place. I have been across the stream a number of times in recent years. There used to be plenty of water 15 or 20 years ago but in the last several years, crossing there in the summer months, I noticed the stream bed was dry. I never swam that far up; usually swam down further. I couldn't say whether this change in supply has been gradual. I never observed it enough to know just how it went down from year to year. But I would say the supply in recent years has been much less during the summer.

I own about 35 acres. I get my water from both creeks, the Big Spring Branch and the East Little Walla Walla. The Ross-Chapman ditch comes out of the East Little Walla Walla at the state line for 15 (16 see Wash. Ex. 11) acres. The other ditch (Eiffert ditch) comes out of the Big Spring Branch about a half mile up in Oregon, for 13 acres. Eiffert is on two ditches. (Mine) is the west one. I get practically no water from the Ross-Chapman ditch. I don't irrigate from the Eiffert ditch. I have had plenty of stock water—that is all I use it (Eiffert ditch) for, practically, for pasture land.

I raise a little hay, alfalfa, prunes, apples, blackberries, some vegetables. I have 16 or 17 acres in fruit. I have changed the character of my farming some in the

last 10 or 15 years. I took out some trees, not a great many, and went into smaller stuff, stuff that don't require much water, such as rhubarb, deep-rooted vegetables. I don't raise any more stock than I used to.

My place needs irrigation but there is no use to try to irrigate it without any water. I make no attempt to water it because I have no water at the time of year I need it. I have plenty of water in the Big Spring Branch but it is for the pasture land—it is salt grass, some blue-grass; wherever the water has touched it there is blue-grass. The water table used to be so close to the top that irrigation used to make the alkali come out but there is a tile put along the road—the road goes along the edge of it. If I had plenty of water, I could wash it out now. The road along the center line of the SW¼ of Section 11-6-35 is the highway running along the edge of my place between Milton and Walla Walla. It runs between my land. The highway has been tiled along the edges 2 or 3 times. The smaller tile was put in about 15 years ago. They put in the larger tile when they put the concrete on, about 1920. The tile didn't exactly drain my land; I figured it kept the alkali from coming up. I figured the alkali wouldn't come above a certain level of the tile.

That salt grass condition does not exist on my brother's place.

Ivor Williams, for the State of Washington, testified in part (110-113):

I live on the Enzroth place of 110 acres now owned by Mrs. Nora Williams, my mother-in-law. It is located along the Walla Walla River in Washington, gets its water from the Yellowhawk, and has a priority of 1895.

I irrigate the place when I have water. I raise alfalfa mostly, a little barley, some pasture, like sweet clover, bluegrass. I began operating the place in '28 and have been operating it since. It was in winter wheat in the spring of '28, when I moved there. The next year we had in some corn and about 20 acres of late potatoes. We haven't been able to raise crops of that kind since. We didn't have the water. It is shut off. We have had to change the character of our farming and raise alfalfa and barley hay. When our water gets short, the Water Master comes around and takes the water away from us and gives it to people that have got a prior right to us. They have always had that prior right. I would say that the soil was a medium loam to a heavy—down by the river I would call it a heavy. It is adapted to raising potatoes and corn and garden stuff—almost anything provided you have the water. I am not able to raise any of those crops at the present time because of lack of water—you take a chance.

The Water Master first came on distributing water in '29, the first year of the adjudication. In '28 we had all the water we wanted — we took all the water we wanted. But in '29 the Water Master in regulating the distribution of water closed our place off. In 1929, he closed it off about the middle of June. Between the years 1929 and 1933, it was between the middle of May to about the first of July that he shut off the water. In 1930, I can't say offhand. In 1931 and '32, it was about the first of June, somewhere around there. In 1933, I think it was about the first of July—we had more water last year on the Yellowhawk.

HARLOW BARNEY, for the State of Washington (116-145, 300-308).

At this place, the following qualifications of the witness were agreed upon in open court:

Harlow Barney resides in Walla Walla County, Washington. He is Water Master of the district including the streams of Walla Walla County. He is appointed by the Supervisor of Hydraulics of the State of Washington under the provisions of the State Water Code. He has held this position since and including the season of 1926. As a part of his duties as Water Master he regulates and has supervision over the administration of the diversion of the water from the Walla Walla River and its tributaries in Walla Walla County.

The witness then testified in part:

J. C. Hammer gets his water from the East Little Walla Walla partially out of the Ross-Chapman ditch and part out of the small diversion we call the Hammer flume at the state line, right at the Interurban Traction bridge, on the East Little Walla Walla. There are two priorities in the Ross-Chapman ditch, a '91 priority and a '92 priority. Mr. Hammer's priority is 1891. When Mr. Hammer is irrigating on the right bank, he diverts water through a small flume for that tract, and then when he irrigates on the west bank sometimes he closes the flume and takes it through the Ross-Chapman ditch.

At this place counsel for the State of Washington stated: For the purposes of the record, I will state that the Ross-Chapman ditch appears on the official map, Washington's Exhibit 17, as taking from the East Little Walla Walla River at a point near the state line in the

Northwest of Northwest of Fractional Section 14, Township 6 North, Range 35, and runs westerly parallel with the state line, and then in a northerly direction in the Northeast of the Northeast of Fractional Section 15, same township and range.

The witness then resumed: The Hoffman ditch is diverted out of the Little Walla Walla Spring Branch.

At this point counsel for the State of Washington explained: The Hoffman ditch was mentioned (by mistake). It really has no part in this examination. I wanted to locate it since it was mentioned. The Interstate measuring point for this ditch is designated on Washington's Exhibit 17 as Number 6.

The witness resumed: The point of diversion for the Hoffman ditch is located about a quarter of a mile south of the state line in Oregon in Section 14-6-35. There is one Oregon and four Washington users on this ditch. It flows in a northerly direction.

Carl Ross gets his water out of the Ross-Chapman ditch and no other. Royal Ross gets his water from the Ross-Chapman ditch and the Eiffert ditch. The diversion of the Eiffert ditch is out of the Big Spring Branch in Oregon. The Eiffert-Dyer ditch is just east of the Eiffert ditch. The measuring point of the Eiffert ditch is designated on Washington's Exhibit 17 as 4-A and of the Big Spring Branch, as 5. Royal Ross does not irrigate to any great extent from the Big Spring Branch. It is largely stock water. The Big Spring Branch is designated as Spring Branch, and the East Little Walla Walla, as East Spring Branch in Washington's Exhibit 11.

Neither Doan Creek nor Stone Creek contribute any water to the main stream during the low water.

I first began regulating the Walla Walla River and its tributaries in 1929, the first season after the decree had been entered adjudicating the rights of the Walla Walla River and its tributaries. Prior to the time of the decree, Washington Exhibit 11, we tried to make peace among the water users and coax them along. I had no real authority to shut off the water until the relative rights had been determined. We regulate the stream on priority under this decree. When there is sufficient water in the stream in a given tributary to satisfy the right of a certain priority, we allow that to run if there are no prior rights on the stream below that tributary, and as the water supply diminishes we cut off the rights of the later priority to satisfy the rights of the earlier priority in accordance with the stream supply. This method is in force generally over the stream system.

The time of stream shortage varies. We generally start to regulating the stream in May. In some years it may be as late as June. Prior to the time we start regulations, we allow the water users to use such water as is available as long as all the rights are satisfied. It is only when a shortage begins in a given stream that we begin our regulation to the awarded amounts. We make a regulation and put a notice on the diverter's headgate. (The time) it takes to cover the stream system in this county varies; it depends on the number of rights you have to curtail; if we are curtailing the priorities (it requires) from 3 to 8 days to make a regulation.

I have kept a list of the regulations that I have made of the stream system from the time I began regulating

the stream under the decree. I made a tabulation of those regulations for each of the years beginning with the year 1929 until last season. This tabulation is taken from my original records. I have checked it with the original records and to the best of my knowledge it is correct.

At this place, the tabulation, being a tabulation of the administration of the related stream system in Washington for the years 1929, '30, '31, '32 and '33 by Mr. (Harlow) Barney, Water Master, was introduced in evidence as Washington Exhibit 27.

The witness resumed: I started to make closures of all rights subsequent to 1892 from June 1st to 10th in the year 1929. I may have had the stream under regulation down to the awarded amounts before this. Then from June 11th to 18th, all rights subsequent to '92 were closed on Mill Creek below Gose Street. Lower Mill Creek generally has a return water that supplies those lower rights a longer period of time than the upper stream rights. It varies from year to year. We regulate Mill Creek with relation to Garrison and Yellowhawk Creeks according to priorities of each of these streams and on Mill Creek above Gose Street. We do not take into account the priorities below Gose Street when it comes time for a closure of those rights (on Lower Mill Creek) because the water all sinks in Mill Creek near Gose Street.

I began closing in 1930, June 10th to 19th and from June 25th to July 6th, on Mill Creek below Gose Street. In 1931 I began regulation May 26th to May 30th, closing rights subsequent to 1894 on Upper Mill Creek, Garrison Creek and Yellowhawk. On Mill Creek above Gose

Street, I closed the rights May 30th to June 3rd and on Mill Creek below Gose Street I closed the rights from June 3rd to 7th.

There has been very little change in the last few years in the summer supply in the tributaries of the main Walla Walla River to the west. I refer to Mud Creek, East Mud in Oregon and Pine Creek. There has been a noticeable increase in the amount of water in the lower reaches of those streams. I live on Lower Mud Creek. I have lived there practically all my life. The supply of the water of lower Mud Creek has increased considerably during the low water season in the summer, as well as in the spring months, too, since I was a young man in that locality. There has been an increase of irrigated land in lower Mud Creek since 1917. Lower Mud Creek enters the Walla Walla River about a mile or less north of the SW¼ of Section 31-7-34 approximately 2 miles above the town of Touchet. Pine Creek enters the Walla Walla River in a southeasterly direction from the Town of Touchet and nearer Touchet than Mud Creek. One of the tributaries of Pine Creek up near the state line is the Little Mud, called South Mud in Oregon. The summer supply of Pine Creek has increased in recent years. There is about 800 acres irrigated at this time on Little Mud (and) Pine Creek. During the time I have regulated the stream under the decree, I have never closed any of the rights on Little Mud or Pine Creek during the summer. There has been sufficient water to take care of all the rights.

In the East Little Walla Walla, up near where the Rosses live, a very sudden drop generally occurs sometimes in May, sometimes in June and once I believe it

happened in July. There has been a change in the summer supply. The year 1926-1927 there was a fairly good amount of water came across the state line to those users under the Troyer ditch and the Ross-Chapman ditch but in '29 the Ross-Chapman ditch used up all the available water and didn't have enough water to take care of their '91 awarded rights. Since '29, it has been short. They haven't had enough water to take care of their rights during July and August. The Troyer and the Cauvel ditch irrigate small acreages. The Troyer ditch is on the right bank and the Cauvel on the left; they both take out from the same diversion dam in the East Little Walla Walla. The summer supply of the Big Spring Branch during the last 6 or 8 years, has diminished to some extent. There has been a tendency for the supply of water in the streams and tributaries to the east to be less during the summer while those to the west down in the Pine Creek (region) have had a greater supply.

In April, 1930, we had a sudden drop in the river and we were threatened to have to close off all the inferior rights, and it seemed awfully early in the season, so I made an investigation of the water supply in Oregon to see where the water had gone. When I went up over the main stream, I found out that the water was all being diverted into the Little Walla Walla River and the Hudson Bay ditch. The division of the Little Walla Walla in Oregon is right in the City of Milton at what we call the broken-down headgate, where the headgate was washed. I got the Water Master of Umatilla County, Mr. Spencer, and requested him to turn down some of the water and he answered that he had no authority to deliver Washington any water. At that time, in 1930, we

would have practically all the ditches running on the lower reach(es) of the stream (in Washington) and they had been running possibly a month. In speaking of the supply in the Big Spring Branch and the East Little Walla Walla, I am speaking of the streams that rise up in Oregon and flow down across the state line, and that is also true to the west in connection with Pine Creek and Mud Creek.

I was appointed Water Master in the summer of 1926. Before the (Walla Walla River) decree was signed I cut off those rights only that were under State Engineer's permit and I took charge of Stone Creek and Doan Creek in place of the former Water Master. Prior to 1926, I had fished the East Little Walla Walla, Big Spring (branch) and the main branch above. My knowledge of these streams was casual. I did not observe the condition of the water so as to make comparisons relative to the flow, only when I would wade it when we were fishing. I made no measurements prior to 1926. My first experience in the regulating of water was in 1926. I had never had any experience in the distribution of water only as a water user.

In the administration of the decree, Washington Exhibit 11, we found that there was a dividing point in Mill Creek at Gose Street, during the low water period, that we would use in the distribution of water. I never examined the stream bed thoroughly but we had the court decree and we had to go on the face of the record and when the water becomes to a certain flow, it automatically takes care of itself by virtue of priorities up stream. For instance, Yellowhawk has the larger priorities under acreage and consequently the stream diminishes Mill

Creek flow at Gose Street earlier than we would have occasion to examine this stream bed. In the ordinary flow it goes dry there for about a quarter of a mile but it starts rising again. The springs in the steam and small tributaries cause it to rise sufficiently to supply the lower users on Mill Creek. In the distribution of water we recognize that particular feature of physical conditions that arises each year. In 1929, we closed the rights subsequent to 1892 (on Mill Creek) below Gose Street between July 11th and 18th; in 1930, between June 25th and July 6th; in 1931, between June 3rd and June 7th. The earlier day (in 1930 and again in 1931) was caused by reason of the diminution of the water supply. The available supply of water in Mill Creek is what regulates the closing of these rights at various times. The drop in the water in Mill Creek each year comes very rapidly.

The drainage basin of Mill Creek is right adjoining the drainage basin of the Walla Walla River in the Blue Mountains. The Walla Walla watershed has a larger area. I don't believe from my observation of the stream that the Walla Walla River supply falls as remarkably quick or as sharp as in Mill Creek. As to whether we had a short year on Mill Creek in 1930, we possibly might have closed rights off on Mill Creek in Washington because the Oregon diverters had taken the water that formerly came across the state line for lower river users. We found after making our investigation in 1930, that it was the practice of the farmers (in Oregon) to go up with scrapers and divert all they could get. My parents live on the Little Walla Walla. I visted home a number of times. I have been there on numerous occasions when they have been doing the work on the Little Walla Walla,

and I have been there with my stepfather, who diverts the water into the McIntyre ditch, and it was always his policy to go and take all the water he wanted. It was always the policy of the irrigators to go to the Little Walla Walla and get their scrapers and teams and sacks and sack that off and then go on down to the Hudson Bay. Back as far as I have been acquainted with it, since 1920, each year the farmers have turned water into the Little Walla Walla.

The dates of my closing off the water in Mill Creek don't necessarily indicate what the water supply in Mill Creek was. Some times it does; in 1929 it (did); in 1930, the whole supply was picked up over in Oregon. We had to go and satisfy our prior rights first in Washington by closing off inferior rights on the related stream system. There is no diversion from Mill Creek for Oregon lands.

I spoke of regulating the tributaries of the Walla Walla River. I regulate the main stream in its relation to the tributaries also. There is a decree which requires us to regulate Mill Creek (with a division) at Gose Street.

(300) Prior to the first regulation of the stream in 1929, it was the custom to divide the waters of Mill Creek and Yellowhawk Creek on a percentage basis. Mill Creek got 60% and Yellowhawk 40%, during the low water period. As between Yellowhawk and Garrison, during that same period, Yellowhawk got 60% and Garrison Creek 40%. It was the custom that had been handed down. The decree modified this custom so far as the division of water up there is concerned, and respected priorities. I administered the division of the water at that point by allowing the water to go down Mill Creek to

satisfy priorities on Mill Creek down to Gose Street in their relation to the priorities in Yellowhawk and Garrison Creek and the rights on the lower stream, the main stream. During the time that I was Water Master prior to the first regulation of the stream in 1929, Yellowhawk or Garrison contributed no water of any amount to the main stream during the low water period, and the (water) in McEvoy Spring Branch was practically all used in that branch.

I do not know how long the custom of division of sixty-forty existed prior to the time I went on as Water Master. It was the contention of the irrigators that that should be the division when I went on. When the decree came in, we administered the stream, Mill Creek, Yellowhawk and Garrison Creek on priority, along with the priorities on the Walla Walla River. Prior to the decree on Yellowhawk and Garrison Creek, there were priorities, after I made the division (between these two streams). The farmers or the irrigators took the water as they could get it. They had a water master, but we had no authority without a decree, because we could not determine the relative priorities. After the decree and the new division, the waters were administered to the individual farmer on priorities. There was no custom of division on Titus Creek. They would take whatever they felt was necessary. After the decree was entered there was water went down Cold Creek to satisfy rights on the stream and the main stream. Prior to the entry of the decree, there was not. This division up at Mill Creek in no way affected lower Mill Creek only in the way of return water, the seepage or something like that. Prior to the decree Mill Creek water flowed past Gose Street,

with the exceptions of the very low water years. Since then when the low water comes, they consume that water. Prior to 1929, I never cut off any of the rights above the Gardena intake for the purpose of supplying Gardena with any water.

Prior to the regulation of the stream in 1929, a larger percentage of water went down Mill Creek. That affected the amount of water that came down Mill Creek and into lower Mill Creek either through seepage or across the surface. The amount of water in lower Mill Creek has been less, at least part of the year, since the regulation of the stream on the decree. Many of the rights on Yellowhawk Creek and particularly this right on Titus Creek, have received less water during the summer season since regulation has been put into practice on Mill Creek and by the same token other users have received more. One of the principal reasons why (some) have received less water is that it is turned down to supply the Gardena priority and other priorities on the stream.

Fred Dill, for the State of Washington, testified in part (161-167):

I live on the Anna Jones property on Garrison Creek located east of Alder Street, Walla Walla, on the north side. Its water right from this creek has a priority of 1900. There are 5 acres in the tract. The stream runs through it. When I took possession in 1925, it was in cherries, peaches, apple trees and prunes. I had sufficient water to irrigate my land in summer until 1929 when the water master began regulating my rights. He shuts the water off from my land always abo[illegible] the first part of June. As a result of lack of water I lost the 2 acres of prunes entirely and they are just laying idle. I am just 3

blocks from the city limits and I got city water to keep the trees alive but it is too expensive. Garrison Creek runs into the Walla Walla River from the north. It runs out of the Yellowhawk and the Yellowhawk runs out of Mill Creek. When I first went out there in 1925 the water run up as late as July—in July we got some. The neighbors among themselves run that water. We had quite a bit of water that time. If there was water there I took it and if there wasn't I didn't. I had no measuring box. From 1929 on I had. At that time I got water for a longer period in the summer than I do now when the water master is on.

LAWRENCE E. CUNDIFF, for the State of Washington, testified in part (169-175):

I own 20 acres of land on Lower Cold Creek. It is a spring creek, totally in the State of Washington, a few miles below the City of Walla Walla, comes from springs, comes out of Blalock Lake, about three quarters of a mile above my place in the NW¼ of the SW¼ of Section 26-7-35. Lower Cold Creek is a tributary of lower Mill Creek and lower Mill Creek runs into the Walla Walla River from the northeast in the NW¼ of Section 32-7-35. The creek runs through my place and is in between Mill Creek and the main stream. My place is located about a quarter of a mile south of the place where the old state road joins the new Walla Walla-Pasco highway and has a water right from Lower Cold Creek with a priority of 1895 as shown on page 86 of Washington's Exhibit 11. I moved on the place in 1908 and have lived on it ever since. I have a prune orchard of 2 acres, then we raise alfalfa and some garden stuff and tomatoes. Last year I raised tomatoes.

The water master first regulated my right on this stream in 1929. Prior to 1929 we had plenty of water so we could get along with it. We had water all season. There was no regulation. We would just go out and get the water whenever we wanted it. When the water master came on the stream in 1929, it was just too bad. We wouldn't get any water after the first of June only what we borrowed or bought, traded for or something, got from the neighbors. Since 1929 we have had to lease water from neighbors that had a prior right and wasn't using it. We just get it from year to year. We couldn't figure ahead. We would just get it maybe for this year and then we didn't know whether we was going to get it for next year or not. We would just take chances. If we were not able to get water from any other source, we would have to change our farming operations to dry farming practically. We have got to have water for orchards and gardens. I have been able to continue my farming operations because I have been able to lease water from older rights from year to year.

After the water master went on the stream, he would take water past my place for the use of others. Before the water master went on, I did not measure any water—just took it. I have a measuring box in my ditch now—put in after the water master went in. It is not possible for me to get water from the sewage disposal of the City of Walla Walla. Cold Creek is west of Gose Street and that point is below where Mill Creek goes dry every year.

RALPH R. HASTINGS, for the State of Washington, testified in part (177-182):

I live on lower Mill Creek, that part of Mill Creek

below Gose Street in the City of Walla Walla. Lower Mill Creek borders my place on the north. It has a water right for 30 acres from Mill Creek with a priority of 1896 as shown on page 86 of Washington Exhibit 11. My place joins the Cundiff place on the west. I have owned the place 11 years. I raise garden and vegetables. Prior to 1929, we had sufficiency of water to do our irrigating with. We got our entire irrigation supply from lower Mill Creek and used the water all summer. The water master began regulating my rights in 1929 and since has closed our ditches along in June. We have to lease water or borrow it from some older prior rights in order to carry on our garden. There is nothing permanent about it. It is just from one year to another. I have been able to do it so far, but how long it will continue, I don't know. If I were not able to get water from leasing or from other sources, I would not be able to carry on gardening. I would have to change to alfalfa or something—I could winter irrigate or something of that kind. When the water master takes the water away from me, he gives it to prior rights below or above me. Before the water master went on the stream prior to 1929, we took what water we needed. We didn't seem to be bothered. There seemed to be a sufficiency of water. They are not giving the prior rights more water than they used to. They are giving us what our decree calls for to a certain time of the year, then we are cut off. So far I have succeeded in leasing this water from the same person each year. I lease from George T. Welch, who has an old right on the main stream about a mile and a half above Lowden. He raises some alfalfa. He uses water to irrigate grease-wood pasture in the early part of the spring and does not

irrigate during the summer time. In order to raise crops on his land, I think he would have to wash the alkali out of it. I do not recall that there has been any development of irrigated land down the river since I went on my place. I think the Gardena district has put more acreage in.

WALTER SAMS, for the State of Washington, testified in part (184-190):

I live on the West Little Walla Walla River. This tributary rises in Oregon, flows across the state line in a northerly or northwesterly direction into the main stream. My land is in the State of Washington and lies about 400 feet from the stream. I have a water right for 26.6 acres from the West Little Walla Walla River with a priority of 1894 shown on page 81 of Washington Exhibit 11. I have lived on this place 26 years. I raise a little fruit, a little barley hay, a little alfalfa. The supply of water in the stream in the vicinity of my place in recent years as compared with the supply 10 or 15 years back, has been getting shorter from year to year. There has been a difference in the supply of water since 1929. The water master closes off my rights some time in June, about the middle. Prior to the regulation of the stream by the water master, I used to get plenty of water in the summer to irrigate my land. The regulation of the stream hurts my farming operations quite a little bit, got to raise something that grows in the spring. After July your ground gets too dry, you can't raise anything. I am raising just about 4 acres of alfalfa now. I used to raise about 16 or 17 acres as a rule. I plowed up 11 or 12 acres and seeded it to barley hay. It does not require water in the summer. You can get along with

a little water in the spring with that kind of a crop. I have been compelled to change my type of farming to adapt my farm to the smaller supply of water in the spring and the lack of water in the summer. Barley hay is a less profitable crop than the crops I had before. My alfalfa had been in three years when I plowed it up. It had begun to kill out, dried out more than anything. When the water master shuts off my water there is mighty little flowing in the stream—not near as much as there was when I would go and get it as I wanted it. The water supply had diminished. 1933 was a pretty good year but there wasn't quite a supply flowed down the stream when they cut my right off. The water flows right through my place to the lower people, but the West Little Walla Walla was practically shut off. The water master cut off my supply in 1933 about the middle of June—not later than in the other years—about the same time. My place is about three-quarters of a mile from the state line. There are quite a string of springs between my place and the state line. Those springs have diminished a little bit in their flow. They have not been increasing any. Prior to 1929 in the summer all my supply of water did not come from those springs. There used to be lots of water come across the state line. Not very much came across in the summer of 1933.

RALPH DANIELSON, for the State of Washington, testified in part (192-196):

I live on Titus Creek. My place is about a mile below where Titus Creek takes off from Mill Creek. Titus Creek is a sort of a branch of Mill Creek about three miles long. It takes out from Mill Creek above the Yellowhawk and returns to Mill Creek below the Yellow-

hawk. It is above the City of Walla Walla. The Baker ditch goes through my place and the Baker ditch is a branch of Titus Creek. My place has a water right for 10 acres from the creek with a priority of 1900 as shown on page 93 of Washington's Exhibit 11. I have lived on the place since 1925. With irrigation I grew corn the first two years and then berries and fruit and garden truck of any kind. When I didn't get water enough for a garden, I put it in alfalfa, and last year I didn't get water enough to bring that, so that was a loss. Prior to the regulation of this stream in 1929, we had all the water we could use. I just went out and helped myself. Since 1929, the water is shut off any time after the first of June. Since the regulation on the stream I haven't been able to get any water during the summer. The water that the water master takes away from me goes on down Mill Creek to prior rights under order of the water master. The water is regulated at the point where Titus Creek comes out of Mill Creek and then I have a weir at my ditch. There is a division box just below where Titus Creek comes out, where there is a return into Mill Creek.

CLIFFORD RIGGS, for the State of Washington, testified in part (198-234):

I am a dirt farmer. I reside in Gardena, an irrigation project a mile south of Touchet. I have resided in Gardena since 1907. I purchased 62 acres of land there in 1905 and now own 93. The land will not grow crops successfully without artificial irrigation. Originally the system of the Walla Walla Irrigation Company watered this land. Now it is the Gardena Farms District No. 13. I am one of the board of directors of the district.

When I went on the place in 1907, it was virgin bunch grass, sage brush, there were no improvements. I leveled the land for irrigation, put it in alfalfa and erected my buildings. I think the second year I had the entire 62 acres in alfalfa. I drilled a well, put in a water system to supply the farm in general. There were 3 or 4 families in Gardena then, now there are 80 families, some renters but mostly landowners. There are 4000 acres or such a matter in alfalfa in Gardena and also east of the siphon, the remaining acreage is in orchards, grain crops, corn and potatoes, rotation crops. The soil is deep and is all of a similar character and productivity. In the earlier stages of the development of the system, we for years got about 8 tons of alfalfa to the acre. It dwindled down to about 7 tons up to 1924. Since 1924 we have been producing less, at least 2 tons less, about 5 tons to the acre. It costs no more to produce 7 tons of alfalfa on an acre in Gardena than to produce 5 tons on the same acre. The cost of producing the crop would be equal plus the cost of the added tonnage put up. The (added tonnage) would be a small item. In fact, I question whether the cost would be any more or not. You take a short growth of alfalfa hay, it is very hard to handle and it will cost practically as much to put up a short crop as it will a normal heavy crop when the hay hangs together, cleans up good, where otherwise your time is wasted in clawing around in order to try to clean up the short hay. The extra 2 tons is practically all profit. I have dealt in alfalfa hay grown in Gardena to a certain extent and I am familiar with the average price per ton. With no exact figures to quote from (I would say) the average would be $10 or better per ton in the stack.

Since 1917 we have put in measuring devices and maintained a regular complete system of distribution. The water is efficiently distributed over the land. The corrugated system is used, no flooding. The irrigators are continuously with the water to take care of it. On certain laterals rotation is practiced.

Prior to 1924 there was a continuous service of water in Gardena proper during the summer months. The canal was never dry in the summer from 1907 when I moved on the place, except in times of breaks in the canal or of making repairs, until 1924. The canal became dry during the summer months in 1924 and has been dry part of the summer every year since then with the exception of 1933, last year. I do not know why in 1924 the Gardena canal went dry in the summer. There was no water in the Walla Walla River at the intake of the canal to furnish water for it that year.

In April, 1930, I took a trip up the river in Oregon and found the water was appropriated to other canals. The supply of water had diminished early and 5 or 6 of us water users went up and made an inspection of the river to ascertain the reason the water was becoming short at that time of year. We found the whole Walla Walla River (Tum-a-lum) dammed off so that the water from the main stream would go down the Hudson Bay ditch at that time. The fellows were standing in the Walla Walla River channel below fishing over into the Hudson Bay ditch.

I never measured the water in the canal. I don't know how much was being entered in the canal. I was interested in the amount I was getting, was why I made the investigation. I know that there was a shortage for

irrigation purposes. My farm had a shortage that year at that time and other farms of my neighbors in that vicinity (were) in the same condition. In 1929 there were about 4000 acres in cultivation (in the district). I couldn't state definitely as to the number of acres.

My place is situated due south from the Town of Touchet towards the lower end of the canal about 2 or 2½ miles west of the siphon. When the canal went dry in 1924, there was no water in it at my place. I didn't go and walk up the full length of the canal. I didn't walk the canal. I assumed there wasn't any water in the canal all along its length. I consider June, July and August as the summer months. As to whether there was water in the canal up until August 30 in 1932, I couldn't tell you the exact dates. I know the canal was dry.

I wouldn't state positively when the siphon was rebuilt. It was built in the fall of '25, '26 or '27, somewhere along in there. It was built under the supervision of Mr. Hartvedt, who has been water superintendent of the district since it was formed in 1928. They did not shut off the water supply during the irrigation season to build it. They waited until the irrigation season was over. A number of years the Gardena canal took sewage water from the City of Walla Walla. It was continued up to the year the disposal was put in at Walla Walla. I couldn't tell whether 1923 was the last year that we used any sewage water. When they quit using sewage water (in the canal), it would be hardly noticeable. That little (3 c. f. s.) didn't amount to anything.

We went up to investigate the water the latter part of April (1930). At that time we were short of water. The water was getting low in the canal. According to

the official measurement of the canal we had as much as 68 c. f. s. in the canal.

At that time I did not examine the diversions up Mill Creek. I didn't even look over the diversions on Yellowhawk or Garrison. I took no notations with me as to the priority dates or the rights of the parties in the matter at all.

In the average year, I would estimate that it costs $7 a ton to raise and put alfalfa in the stack. I have had no experience of raising alfalfa in any other place besides Gardena. I have not observed or in any way studied the raising of alfalfa in any other place. I do not know what the general experienec is as to the amount of production in other places.

The soil (in Gardena) raises very good fruit. Most of those who started raising fruit have taken their orchards out. A few years back they was hardly getting sufficient water. The market conditions, in cutting down the market price, has made it a financial problem and in a way some have solved it by taking out their orchards and going to alfalfa. I couldn't say that fruit raised in that section suffered from frost damage in blossom time any more than many other sections. We have had occasions of frost damage but that was pretty general. It wasn't only there, but other places. Our lands are situated a little differently. We are on a bench 60 or 75 feet, probably more than that, above the river lands in the valley. At one time there was a considerable plant of orchards in that project. Beginning about 1920 to 1922 the Walla Walla Irrigation Company commenced taking them out. I had 20 acres of apple orchard at one time and took it out in 1926 or '27. The taking out has been

so general that there are no commercial orchard tracts on the project now. The orchards have all been pulled out except 4 or 5 acres. I have got about 3 acres.

Whether there is a general dwindling down of the amount of alfalfa that is raised to the acre, after the production has reached the peak stage, depends upon the age of the alfalfa and the ability of the farmer but we have alfalfa fields there that's been in for 20 years and is in today and has been producing very good. The production of alfalfa requires a resetting in most cases in every 7, 8, or 10 years. I think it is profitable to reset your alfalfa every 10 years any way, and, in a good many cases, 5 or 6 years. Whether even by resetting there is a general reduction from the peak to an average level, I can't say. If your soil conditions are kept up, alfalfa is a soil builder. It may be true that alfalfa is not a soil builder for itself but for some other crop. I couldn't tell you exactly as to that (but) by reseeding your alfalfa, renewing it, you get a good yield if you have got sufficient moisture to produce it. The general practice in reseeding is some rotation of crop, potatoes and corn, principally potatoes. Alfalfa as a general rule hadn't been reset in 7 or 10 years up to the last few years. We have (had) winter freeze that has killed the alfalfa out to come extent, two different winters since 1922. About that time we had one period that froze out a part of the crop and last year it was a pretty general freeze out. When I say it froze out a part of it, I mean a certain area and part of the plants. There would be a few that wasn't affected at all, right at the midst of the district that was frozen on all sides. We practically only had two very serious winter kills.

Since 1924 we have gotten as high as $23.00 and as low as $7.00 a ton on board the cars at Touchet. Just one year, last year, was (alfalfa) $7.00 a ton on board the cars. The bailing cost is $2.50 a ton, the hauling 50 to 75 cents a ton. We have never had a year in which we were unable to sell alfalfa hay. There is about a normal consumption barring years like this (last year).

LEE H. SMITH, for the State of Washington, testified in part (236-252):

I have resided in Gardena since 1919. I purchased 63 acres developed with dwelling house and barn. All in alfalfa. I have grown corn, sugar beets, potatoes and hay and a nurse crop, reseeding that is, grain nurse crop. When I went there in 1919, there seemed to be plenty of water—that is, sufficient for summer. The pronounced shortage occurred in the fall of '24, the summer time. The canal had not been dry during the summer months from the time I went there in 1919 until the summer of '24, when it was dry. In '24 I had corn and late potatoes; I think I had sugar beets that year, too. I grew late potatoes until 1925. Since '25 have grown early potatoes. Back in '21, '22, in there, I was getting 250 one-hundred-pound sacks (of late potatoes) to the acre. In 1925, I had 15 acres of (late) potatoes in and my yield that year was 100 sacks to the acre. In '25 the ditch went dry and couldn't get water enough to set the potatoes or carry them through the hot weather which we formerly did before that. (In '25) there was a freeze in the east; I sold what potatoes I grew—I had 15 acres, 1500 sacks—for $2.50 f. o. b. the cars at digging time. If I had had my 200 or 250, it would have been a killing. I started growing potatoes in '22. There were

about 300 acres in potatoes in Gardena that year. It hasn't been the same since then. When the shortage of water came, that is, dropped off, why, of course they all had to go to early ones, and naturally some of them dropped off, or most of them, in fact, most of them. Last year we had 33 acres of early potatoes and we had 11 cars. That would be practically 300 one-hundred-pound sacks of No. 1 potatoes to the acre.

I would estimate that there were 3000, 3500, somewhere in there, of acres in alfalfa under the Gardena project in 1924. That number of acres has continued practically since. I have dealt in hay as a buyer and seller for 6, 7 or 8 years. I have been state deputy hay inspector. I heard Mr. Riggs' testimony on the effect on hay production since 1924. I have grown alfalfa myself. I have kept pretty close track of the production and I would say that since 1924 four tons per acre is nearer the average, possibly 4½. Previous to '24 the average production per acre run 6, 6½ to as high as 9. Of course, that is individual pieces, you see. I would say as an average of the lessening of production, at least, 2 tons per acre. We have found since '24, or the period after the ditch was going dry, that our third cutting being dry, the Russian thistles thrive on dry land. It is from lack of water. If the third cutting has plenty of moisture to grow, they won't come in, don't you see, and there is quite a considerable of Russian thistles come in the third cutting now. Before 1924 it was a common thing in the district to get four cuttings. Since '24, occasionally where you cut the second cutting real short, early, you get a fourth clipping, but it would be very light, for purposes of rabbit hay. That is the only in-

stance I have known of in a long while to have a fourth cutting.

Last year, '33, there was water pretty much all summer until September, that is a small amount for gardens and little stuff. There was an extra amount of rain in the district last season. From 1919 until '24, the canal was never dry in the summer that I know of. The main canal runs right by my place.

As a hay buyer, I have been familiar with the prices of hay since 1924. I believe it was '26 or '27, along in there, I paid as high as $24 a ton on board, one year. I sold it at one dollar a ton advance. Two years, I know it was $19 to the grower and last year (1933) it was the cheapest, approximately $7 to the grower. The minimum average price per ton for hay in the stack in Gardena in 1924 I would say (is) from $10 to $12. It wouldn't be less than $10, because there is only one year that it was sold for less than that.

The year 1925 was not a high water year down our way. I couldn't say whether there was more water went down the Walla Walla river in 1925 than any year since. There might have a lot of water went down early in the season, but along in July it was short. I don't think there were about 2000 acres added to the cultivation on the Gardena project (during) the next 2 or 3 years following 1919. It was pretty well all in. There was a few pieces going in, but not any great amount. There has been a slight increase, yes, but not any big increase that I know of. Really, I don't believe that there is very much of the bunch grass land that went in. They have been shifting around in those freezes and reseeding and having to grain a year and something like that, then seeding

it back but I don't know of much of any new stuff that has been put in.

In the summer months of 1919 I had enough water in the summer months, June, July and August, to get by on our perishable stuff. You see there usually wouldn't be over two or three hundred acres and by rotating you can get on smaller amounts. We irrigated our alfalfa in July (1919). We usually have had water some in July for our alfalfa. We didn't have any full head or big head or anything like that but we had water. There was water. When I went there in 1919, I think the usual run of the alfalfa growers irrigated their alfalfa in July, possibly not in the very latter part. I couldn't say whether they irrigated their alfalfa in August. I don't remember (whether) I irrigated my alfalfa in August (that year). I know that there was water in the canal the whole season. I had plenty of water in 1922. I don't remember if we irrigated our alfalfa, but I know I had 20 acres of potatoes and I got water in August for those, I couldn't remember whether I irrigated my alfalfa in July of that year. The potatoes and corn and perishables naturally would have the preference in the distributing of water. I suppose they gave them the preference. I don't remember. There was no regulation; it was just the consent of the users. In 1927 I discontinued the late potatoes. I did not get to irrigate them in July. In 1930, I did not irrigate my potatoes in July. I discontinued the late potatoes and was raising the early ones and they were through irrigating before that date.

C. P. HARTVEDT, for the State of Washington, testified in part (255-294):

I reside in Wal[illegible] Walla county. During the last 28

years I have been engaged in designing, constructing and operating irrigation projects in the State of Washington. From the year 1926 I have been in charge of the operation of the Gardena canal owned at this time by Gardena Farms District. When the Water Code was enacted in this state in 1917, I was the first water master appointed for this county under the Code. I held the position of water master for this county from the year 1917 to 1922 inclusive. At the time of my appointment, the rights of the Walla Walla River had not been adjudicated. There were no measuring devices on the stream. There was no attempt at regulation of the stream. We had no authority in fact to enforce regulation. The only weirs constructed in the stream system from 1917 to 1922 was at the Gardena canal, and for the flow which had to go on down the river. That was in the main river at the Gardena intake. During the whole period that I was water master, with the exception of the East Little Walla Walla, the tributaries of the main stream contributed no water to the main stream during the low water period. The Yellowhawk on the north did not contribute anything during the low water period. The McEvoy Spring Branch contributed very little, if any. In those years from 1917 to '22 (there) was a pretty good flow of water in the main stream right at the bridge in the Milton-Walla Walla state highway, and also in the East Little Walla Walla River. I used the bridge to observe the supply of water in the main stream. It was right on the highway. The supply in the East Little Walla Walla was from 10 to 15 c. f. s. I believe, at that time. I didn't measure it. That was just my observation. I know the water flowed down the main stream all summer from the

East Little Walla Walla. That was really all the supply that reached the point of the Gardena diversion. (It) came from the main stream and the East Little Walla Walla. On July 1, 1917, the Gardena canal was diverting 65 c. f. s. according to Washington Exhibit 18, page 13. It does not show any amount left in the river, but evidently it was practically all picked up until the 14th of July when the Gardena canal was diverting 47.54 c. f. s. (leaving) a balance in the river of 20 c. f. s. On August 1, Gardena canal 22.1, balance in the river 22.1 c. f. s. On September 1, Gardena canal, 18.15, balance in the river 20 c. f. s. Passing on to the year 1918, July 1 to 3 inclusive, Gardena canal 33.26; left in the river 21.33 c. f. s August 2nd to 5th, Gardena canal, 29.40; left in the river, 13.91 c. f. s. September 1st, Gardena canal, 29.40; left in the river, 12.06 c. f. s. Passing on to the year 1919, July 2nd, Gardena canal, 26.88; left in the river, 10.71 c. f. s. August 4th, Gardena canal 13; left in the river, 9.72 c. f. s. September 1st, Gardena canal, 9.10; left in the river, 12.42 c. f. s. Passing on into the year 1922, July 1st, Gardena canal, 34.58; left in the river, 12.76. At this date the canal received 3.08 c. f. s. sewage. On August 3rd, Gardena canal, 16.10; left in the river 11.34 c. f. s. and the sewage remains the same. September 1st, Gardena canal, 30.66; left in the river, 1.60 c. f. s. There was a supply in the main stream generally throughout the summer for the use of the Gardena canal and lower users below.

I was away from Walla Walla county from the fall of '22 until the fall of 1925. Upon my return (in 1925) I took charge of the operation of the Gardena canal and have been continuously in charge since. Upon my return

I had occasion to observe the supply of the stream duri the low water period. There was a very noticeab change in the summer supply. (There was) very muc less water in the river at the state highway bridge. Sin that time the water has been very much less every ye during the summer. (The river) practically goes dr there in the summer time. The supply of the East Litt Walla Walla in recent years is much less than it was fo merly. Even with the shutting off of the rights on th East Little Walla Walla in recent years the supply goin down (to) the main stream does not exceed 5 c. f. s. du ing the low period.

In 1917 I became superintendent of the Garden project, (then operated by) the Walla Walla Irrigatio Company. At that time the canal system was in fai condition but they had no measuring weirs. I complete the installation of weirs by July 1st, that year. Sinc 1917 all water has been measured to the users. When I took charge in 1917 some repairs were being made o the siphon by the Irrigation Company. I had nothing t do with the repairing but in the fall of that year, I re newed about 2000 feet, and renewed or repaired it fro year to year as necessary. When Gardena Farms Di trict No. 13 took over the system, I continued on as super intendent and am still with them. I had full charge o the construction of the new siphon—I purchased the ma terial, employed the men, and supervised the work. I constructed the diversion works in the fall of 1917. It was all constructed of concrete except the apron, which was of timber. And since the district became the owner, we have constructed a concrete apron on the diversion dam. The Gardena District irrigation system is now in

very good condition. In comparison with other diversion works and irrigation systems on the Walla Walla River and its tributaries, I believe it is far the most up-to-date system in the valley.

There are Class A and Class B rights on the Gardena irrigation system. The lands with a Class A right were those having a water right sold by the Walla Walla Irrigation Company prior to 1917. (Some) rights were exchanged for rights of way. Lands with a Class B right are those that in 1917 were owned by the Company. In case of water shortage in the low water period, Class A lands have a preference.

From 1917 until I left (in 1922), the Class B rights got water for a longer period in the summer than they got after my return in 1926. The Class B lands were affected the same as the Class A lands as to production because of the water being shut off sooner. If they don't get water after they get their first crop of hay off, the production is very light and that has happened since I have been back this last time. Last year we delivered water to 2,245.5 acres of Class A lands. That has been the acreage over a period of years.

The sewage of the City of Walla Walla conveyed to the Gardena canal never attained a greater quantity than 3.08 c. f. s. They discontinued the use (of the sewage) in the late '20s.

I heard the testimony of Mr. Clifford Riggs about an inspection of a dam in Oregon at the intake of the Milton-Freewater and Hudson Bay Irrigation Company's canal out of the Tum-a-lum. I made an inspection of that dam in April, 1930. They have a concrete diversion dam—it is pretty well covered with gravel but they put

planks on and close it up tight, so that all the water can be diverted down through the Hudson Bay canal. It dammed off practically all the water in the main stream at that time—a little leakage went through. (This dam) is at what we call the Nursery Bridge, right below the railroad bridge. The diversion of the Milton-Freewater and Hudson Bay Irrigation Company out of the Tum-a-lum runs west and joins the Little Walla Walla, and comes out of it a little further down. It was my belief when I was here from 1917 to 1922 that their point of diversion was entirely from the Tum-a-lum. The Milton-Freewater and Hudson Bay Irrigation Company employed me to construct a weir in their canal just before it joins the Little Walla Walla and it was my understanding that they were required to keep measurements there and divert the same amount from the Little Walla Walla down at the Frog. That is why a weir was installed there. Mr. Burlingame had the controlling stock of the Hudson Bay Company at that time. He (also) owned the Walla Walla Irrigation Company at the same time. By mutual agreement between the two companies, from 1918 to '22, I used to shut off the Hudson Bay diversion for the Gardena canal.

The Gardena canal didn't go dry at any time in the summer (from 1917) up to the time I left in 1922. It went dry in the summer of 1926. I don't know what happened in '24 or '25. I was not there.

On cross-examination by Mr. Cochran, counsel for the State of Oregon, Mr. Hartvedt testified in part (273):

When I went up in April, 1930, to see what was causing the shortage of water to Gardena, no water was turned down as a result of that visit. During April,

1930, the Hudson Bay was diverting 68 c. f. s. and beginning in May, 70 c. f. s. was diverted. The supply for Gardena on April 22 was 68 c. f. s. On May 14 it increased to 71 c. f. s. and on May 22 to 99 c. f. s. A big rain came on June 2nd and the (Gardena) diversion was increased to 107 c. f. s. At that time in 1930, 5631 acres were under contract with the Gardena project. There has been no change in the amount of land since 1930. In 1933—that was about the same acreage as in 1930, we delivered water to 5445 acres. Some of those acres might not have been all in, but nevertheless (we) delivered water for that amount of acres. Under our decree, we were entitled to 75 c. f. s. in May, 1930, I believe. The most we have carried (in the canal) is 132 c. f. s. but we spilled a proportion of that out of the spillway. The exact acreage irrigated in 1933, according to Stipulation No. 5, was 5,204.51. That amount of acreage would allow us 69.38 c. f. s. but we are delivering the full amount. Say 80 acres of land, the individual may require only 70 but he gets 80 acres of water; he is paying for it. The decree doesn't limit the amount of water to each individual. I don't believe the district would have any authority to do that. In place of limiting a water user to the actual acres, according to the duty of water as given by our decree, we give him the amount he pays for, the amount that is on the assessment roll. If he calls for his water, he receives it, if we can furnish it, regardless of how much he has under irrigation. If he wastes it, of course, we close it down. The district notifies the State Hydraulic (Engineer) and the water master as to the number of acres we propose to irrigate the following year, and that is what we receive water for. In arriving

at the number of acres for the certificate to the Hydraulic Engineer, we simply take the number of acres that is paid for upon the assessment roll. We don't know when they are putting in this additional land. Like this year, there are a few pieces owned by the company and they are putting in all their odds and ends this year. From 1926 down to the present time, there has been some increase in the land irrigated, not very much. From 1919 to 1920, the Walla Walla Irrigation Company improved a considerable acreage of their lands. I believe (there) must have been some other company owned land that is not included in your Stipulation No. 5 (for 1919) because there has not been any great amount of land improved the last few years. There have not been times when there were contracts outstanding that were not being used, that I know of. That isn't the case at the present time. In 1933 there were 216.56 acres being paid for (but) not being irrigated. That is what we call the (Walla Walla Irrigation) Company lands. Then there is about 15.45 acres of company lands in Oregon not irrigated, payments are being made on it. That is being put in alfalfa this year. The company lands are owned by people who have foreclosed the mortgage. The water right was attached to those lands by the company (before) they issued the mortgage. There is no individual down there that owns lands not irrigating it, except one 20-acre tract owned by John Merry and there is a 115-acre tract owned by Mr. Rowen and the Federal Land Bank foreclosed; there is some of that land that wasn't irrigated last year.

In 1918 Mr. Burlingame and I went up to the Hudson Bay headgate at the Nursery Bridge and turned

water from the Hudson Bay diversion down the Tum-a-lum. I couldn't tell the date because I didn't keep any record of that. I don't remember now exact dates, but anyway it was when the stream flow commenced to get less. It was probably the latter part of June. I couldn't tell how long they permitted it to run there because I had lots of work to do those days and I didn't get back there very often. As to what time they turned the water down in 1919, I would have to make the same statement for that year because I have no dates. Burlingame went up with me two or three different times and then he had a patrolman there—the man that is on there now—I can't recall his name. The ditch walker of Hudson Bay, Bowman. As to what time I went up there and turned the water down in 1920, I make the same statement for that year. I kept no record of it when I did turn that down. It was before the 23rd day of June, when they closed down the Hudson Bay ditch. It was when the water got short in the river. I believe 1920 was a short water year. The water ran down that particular stream bed, the Tum-a-lum stream bed, and it always reached the Gardena canal the following day. This water was turned down the channel, understand, before the stream bed was dried up. After the stream bed is dried up it will take many days. If my memory doesn't fail me, we practiced that every year. At that time Mr. Burlingame had the controlling interest in both companies. I think he tried to be fair in attempting to adjust the water so as to furnish water for both. I did not measure the water that was turned down—just a guess. We have no record to show. In 1930 when I went up there no water was turned down. In 1930 Mr. Burlingame had lost control

of the Gardena project. He still owned a considerable amount of land. He still had control of the Hudson Bay. The increase in the supply of water occurring in May, 1930, as shown on page 21 of Exhibit 18, was not occasioned by any turning down of water by the Hudson Bay. I have no record that shows the increase of the water supply by reason of water having been turned down, in the Gardena canal. It wouldn't show the full amount of the turn-in, you understand, from the Hudson Bay, it wouldn't show up at the Gardena intake the following morning, but we did know that there was an increase, but it would run for—it would sort of balance up, drain out the pond in the Tum-a-lum section. We have no record that would show as to the amount in acre feet that was coming through. The increase from that source would be hard to tell, the condition of that stream, in 24 hours. It is a material change. The measurements on the Gardena canal for 1918 shown on page 15 of Exhibit 18 shows a diminshing flow in the Gardena canal from the 10th of June down. On page 17 (of Exhibit 18) for 1919, we have the same condition, a diminishing flow in the Gardena canal during June. On page 19 (of Exhibit 18) the measurements for 1922 show a diminishing flow the latter half of June but an increase on the 28th. I testified that when I came back in 1926 I noticed a very material reduction in the amount of water that was being carried in the canal in July and August, especially August, than was carried in the same months in 1919. On June 29, 1926, there was 16 c. f. s. After that the canal went dry. On July 22, 1927, we have a measurement of 14 c. f. s. in the canal and 7 (c. f. s) in the river. On July 21, 1919, there was 15 c. f. s. (in the canal), left in

the river 9 (c. f. s.), about 25 c. f. s. in the river on that date. I know the Gardena canal went dry at that time from 1926 on until last year, and prior to 1922 it did not go dry. In 1928, on June 23, there were 25 c. f. s. in the canal and 13 left in the river, making 38 c. f. s. On June 22 in 1919, there were 36.74 c. f. s. in the canal, 11 c. f. s. more than on June 23, 1928. There are no measurements after the 23rd. The canal may have run 3 or 4 days after June 23rd (in 1928) before I went back and it was closed off to supply prior rights down the river. In 1929 the canal went dry on July 15. That was because of the regulation of the water master under the Walla Walla adjudication decree. We were cut off to supply prior rights lower on the river. When I was first appointed water master in 1917, it was part of my duties to enforce the decree in the Lowden Case against the Gardena people. I was at the same time superintendent of the Gardena project.

The number of acres of the Class B rights under the Gardena canal is the balance between 2245.5 and 5631.31 (3385.81). Except as between themselves, the owners of A and B rights in Gardena have the same priority as against third persons. The priority between the irrigators there resulted from a proceeding before the Public Service Commission of the State of Washington. I was sent there by the Commission to put in measuring devices and distribute the water and make a recommendation as to duty of water and change of the irrigation season. The old original contract provided for irrigation season to begin April 1st and end November 1st each year, and they found it more desirable to start the irri-

gation season March 1st, simply because it is an early country.

The Public Service Commission did not enter an order but the understanding was that the lands that had been issued the water rights up to that time should have the preference in water.

On redirect examination, Mr. Hartvedt testified in part (294):

In my answer to the question whether or not the water passed through the Tum-a-lum when I shut off the Hudson Bay canal, I said "No." I didn't mean that. It did go through simply because the stream channel hadn't been allowed to dry up before we turned the water down.

With respect to Class A rights, when I went to Gardena at the request of the Public Service Commission in 1917, 2245 acres had been sold by the Walla Walla Irrigation Company and these were considered as Class A rights and lands that was held by the company was treated as company lands, and, as I stated before, if there was a shortage of water, those company lands took the shortage. After that was fixed, when those lands belonging to the company were sold to individuals, they continued to take a Class B water right and were treated as such.

JAMES G. WOODBURN, for the State of Washington, testified in part (312-425, 1179-1187):

I have the degrees of B. A. and M. A. from Indiana State University and the degree of B. S. in Civil Engineering from Purdue University. I also have the degree of Ph. D. in Hydraulic Engineering from the University

of Michigan. I spent two years in graduate study in Hydraulic Engineering at the University of Michigan. I was a Freeman Traveling Scholar studying Hydraulic Engineering in Europe from July, 1929, to August of 1930. Since 1930 I have been Associate Professor of Hydraulic Engineering at the State College of Washington. I hold that position at this time. When I first came west in 1924, Dr. Waller of the State College of Washington was working on studies in regard to the irrigation of the Columbia Basin, and I assisted on certain phases of his investigation at that time. I am an associate member of the American Society of Civil Engineers.

I have made a study of the Walla Walla River system with the idea of reaching some conclusions as to the available supply of the river. I first came to the Walla Walla project in June, 1932, for the purpose of making those engineering studies, and since that time I have spent parts or all of a great many days on this work. During the summer of 1932, I spent two entire months in field work and office work, computations, and during the summer of 1933, I also spent two entire months on this study. During the winter I have spent considerable time on computations, with some additional trips to the field to look up and check points in doubt as they arose during the studies. All of the stream flow records of Walla Walla River and Mill Creek, I have looked up and studied for the purpose of determining the available supply of water and of supplementing the measurements and tests which were made during the past two years. I have also had access to the measurements that were cooperatively made in the last two years between the two states—not only have had access to them but assisted in

making the measurements, and to some extent, to a considerable extent, directed the making of those measurements.

At this point the following occurred with respect to designations on the map (Washington Exhibit 17):

THE SPECIAL MASTER: Gentlemen, as the witness proceeds with his testimony upon this map would it be satisfactory if he makes such designations upon the map—when he refers in the record to a particular point may (he) mark it (in red) so we may turn to his testimony and know what he is talking about?

MR. COCHRAN: I think that is a very good suggestion.

THE SPECIAL MASTER: If the witness will do that—if the data is not shown upon the map if you will just take the liberty, Dr. Woodburn, of making a notation on the map—for instance, the point to which I address myself is marked X,—and put an X upon the map.

The witness then resumed:

I will first describe the project in a general way and then come down to particular details.

The water which is used for irrigation in that part of the project of the Walla Walla valley in question comes from two chief sources; one is the Walla Walla River, which is fed by the south fork and the north fork, the south fork being the largest.

The Walla Walla River rises in two forks in the Blue Mountains, flows in a southwesterly direction, in a westerly direction and northwesterly direction, the junction of the forks being in section 22, township 5 north, range 36 east. From that point the Walla Walla River flows westerly, then northwesterly to Milton, Oregon, where

it divides into distributaries, one of the main distributaries of which is called the Little Walla Walla River.

The main Walla Walla River flows north from the branch of the Little Walla Walla through the east edge of Freewater and thence northerly to the state line. There it turns abruptly to the northwest and after a flow of about five or six miles to the northwest it turns to the west and flows to the Columbia River at Wallula.

The principal tributary of the Walla Walla River is Mill Creek, which rises in the Blue Mountains only a few miles from the headwaters of the north and south forks of the Walla Walla River, and flows for some distance in the state of Oregon, thence turns to the northwest and flows across the state line into Washington, thence further to the northwest, thence to the west, and thence somewhat to the southwest, to its mouth in the Walla Walla River in section 31, township 7 north, range 35 east.

The nature of the flow of the Walla Walla River and its forks and in Mill Creek is quite similar. Both streams flow for some distance from their source through narrow canyons which on their lower reaches are filled to some depth with gravel and boulders and local deposits of silt.

Through the canyons below point marked "A" on the Walla Walla River and below the state line on Mill Creek there are some irrigated tracts which take water from the respective streams.

The tributaries of the Walla Walla River other than Mill Creek are minor in character, particularly during the low water season, and contribute a smaller supply to the flow of the Walla Walla River, so as to be practically

negligible, at least during the summer season. Those tributaries are Couse Creek and Birch Creek in Oregon, and Cottonwood, Reser, Russell and Dry Creeks in Washington. These creeks are all noted on the map.

The streams, the Walla Walla River and Mill Creek, are fed during the low water season almost entirely from ground water flow, because of the scarcity of rainfall during the summer season. Their source is in the springs and ground water, seepage flow in the Blue Mountains, augmented during their courses down the valley. Both streams after flowing through their canyons, which gradually widen, emerge suddenly on to broad, alluvial fans, which have been built up by those streams by the debris which they have brought down from the mountains.

Both streams flow across those alluvial fans; and around the lower fringes of the fans, in addition to the streams themselves there are many natural gravity springs which drain the water from those alluvial fans and which return them again to the Walla Walla River.

The water emerging thus from the Mill Creek fan is so situated that it can be used for irrigation on the lower lands of the project. It extends as far as the western end of the Gardena tracts southwest of Touchet.

The water emerging from the Walla Walla River fan in Oregon, however, can only partly be used on the lands in question, because the water which emerges in springs on the western end of that alluvial fan is too far west to be so used. Only the water emerging from the Walla Walla River fan in the eastern part can be so used on lands having rights on the lower Walla Walla River, which river is the chief source of the ground water supply.

According to investigations as far as they can go back, there have always been springs around the fringes of the deltas in both Mill Creek drainage and Walla Walla River drainage. The springs have been shown to vary directly with the flow of the Walla Walla River, which is dependent on the precipitation in the mountains, to some extent the precipitation over the lower valley, and particularly on the snowfall in the mountains during the winter season.

I might point out in that connection that any change, artificial or otherwise, in the regimen of the flow of Mill Creek or of the Walla Walla River, particularly the Walla Walla River, which creates less water in or on the eastern part of the alluvial fan and increases the supply in the western part, thereby diverts water past intakes in Washington for rights on the Walla Walla River.

With that general survey of the project, I will go back up to the headwaters above all irrigation on both Mill Creek and the Walla Walla River and progressing down the stream point out the nature of the diversions and the disposition of the water supply.

First, on Mill Creek, because it is simpler, the Walla Walla city intake is in Oregon and diverts water to the house at which it is measured approximately at the state line. There is there a measuring weir for measuring the diversion for the city of Walla Walla. That diversion goes by pipe line to the reservoir shown here, from which it is distributed to the city; and the unused part, that is, the part that is not required by the city, depending on the supply required from hour to hour, the unused part is returned to the Mill Creek above the mouth of Yellowhawk, the spillway being shown on the map.

The supply of water furnished the city is measured by Venturi meter on the supply line. Below the state line on Mill Creek there are a few diversions for irrigating tracts. Those are shown on the map.

There are one or two very small and insignificant tributaries which flow practically no water in the summer.

At the mouth of Mill Creek canyon, or somewhat above the mouth, Titus Creek leaves Mill Creek to the right and flows for some distance through irrigated lands, with a return to the river at the lower end of Titus Creek.

Just below Titus Creek, about a mile below the head of Titus Creek, Yellowhawk Creek leaves Mill Creek to the left and just below that leaving, Garrison Creek leaves Yellowhawk Creek to the right, and these three streams, Mill Creek, Garrison Creek and Yellowhawk Creek, flow in approximately parallel channels to their mouths in the Walla Walla River, the first being Yellowhawk Creek, the second being Garrison Creek, and the third being Mill Creek.

The city of Walla Walla is about on the center or the lower part of the alluvial fan of Mill creek.

Returning now up to the forks of the Walla Walla River, from these points marked A on the map there are small irrigated tracts in the narrow canyon valleys where silt deposits have made farming possible. These are local silt deposits on benches which have been deposited by previous flood periods of the stream which have been greater than anything which has been measured in historical times, because if the flood had been great enough to be over and cover those lands it would have taken the soil off rather than depositing soil, unless the flood had

been great enough to have a slow enough velocity to deposit soil on those bench lands.

These diversions coming down the south fork and coming down the north fork are in the nature of small individual ditches in which, apparently each irrigator goes to the stream and scrapes out his ditch and piles in rock in order to turn water into his ditch which will take water to his small tract of land.

At the upper end of the irrigated area the canyon is from fifty to a hundred yards wide at the widest, and that width gradually increases until at the mouth of South Fork the South Fork canyon is possibly three hundred yards wide, and the North Fork canyon is maybe a hundred and fifty yards wide.

By far the larger percentage of the water comes from the South Fork, as will be shown in later records. I have been to the head of irrigation on the South Fork and to the head of irrigation and somewhat beyond the head of irrigation on the North Fork, and have investigated most of the ditches on the South Fork and have supervised measurements of all the ditches and scouted the North Fork completely for all diversions.

On the South Fork, for instance, diversions, starting from 17, will enter one of the tables which I have computed. Diversion 17 is called the Poulsen, (spelling) P-o-u-l-s-e-n, according to my copy of the Oregon decree. In some of the records the name of this diversion is spelled P*a*ulsen but in the copy of the decree which I inspected it reads Poulsen and it is carried in my datum as Poulsen. The Poulsen diversion takes water from the right bank of South Fork by means of a rock and gravel embankment, which has apparently been built in

rough and ready manner, conducts water for some hundred yards parallel to the county road and distributes water then to a small tract of ground which is cultivated.

Proceeding down stream, the next diversion is what I have referred to as the Hopkins Ditch, according to local testimony on the ground and to several of the rights as indicated in the Oregon decree naming that the Hopkins Ditch. There are other names for all of these ditches. I have taken the most commonly used.

The Hopkins Ditch, therefore, Number 18, diverts water from the right bank of the South Fork, conducts it through a rather thicket of cottonwood trees to a point at which there is a turnout to the left for an irrigated tract, the main ditch proceeding away from the river to irrigate lands down stream for over a mile.

The waters of the Hopkins Ditch are, apparently, as far as I could find out by inspection on the ground, mingled with the waters of the next succeeding ditch, No. 19, which I have called the Rhuberg-Powell Ditch. These waters are also mingled with a small diversion, No. 20, which I have called the Gray-D[illegible]aris Ditch. These are all ditches which divert water directly from the river with no control works other than manual labor of dropping rocks or boulders or gravel into the river or raking it out to adjust the flow of water in the ditches.

Just above the mouth of the South Fork is the next ditch which I might mention, the Dorothy Ditch, which diverts water to the left of the South Fork.

About a mile above the mouth of the North Fork is the Bowlus Ditch, which diverts water by means of a kind of a timber crib held down with rock into a gravel chan-

nel, which conducts water for some rods to the head of the irrigation of the lands under the Bowlus Ditch.

I will take up these ditches all more in detail later, in regard to amounts of water and acreages.

Just below the forks, in a position slightly different than shown on this map, due to a change through the flood conditions last year, diversion No. 24 leaves the combined Walla Walla River, that is, the two forks are now combined—the Demaris Ditch, diversion No. 24, takes out to the left by means of a timber, log and rock dam filled in and stopped up with some brush and grass and irrigates lands on the left bank of the river which have been formed by a rather wider bench now than the benches in the forks.

The next diversion I will mention is the Spence diversion, No. 40 on the map, which diverts water by means of a log and rock dam into a wooden flume, thence through conduit under the highway, thence into kind of a distributing box, from which there is a return to the Walla Walla River directly, the water for irrigation being diverted to the right from that point into an earth ditch, from which it flows to the lands irrigated by that ditch, which extend for nearly a mile down stream from that point.

The Zell Ditch, the next number, 42, is formed by removing rock and gravel from the head of the ditch and piling it on the down-stream side, so that the water will be diverted into the ditch. This ditch diverts from the right bank of the Walla Walla River and conducts water about seventy-five yards to a wooden sluiceway, at which point a return goes directly to the Walla Walla River, for waste water, and the main ditch is carried to the

head of the lands which are irrigated thereby. At that point there is a concrete box which divides the water into three ditches and which was used for the purpose of measurement this past summer. This is not really a weir, but it approximated weirs so closely that we considered that we would get fair results by its use for purposes of measurement. From this concrete divide the water enters various ditches and is conducted over the project, which extends for over a mile from the intake from the river.

We come now to the Milton power plant and the division of the water at that point. I have said nothing yet in regard to power diversions.

The Pacific Power & Light Company has a right on the South Fork, water for which they take out at about the head of irrigation and conduct through a pipe line to their power plant in section 26, township 5 north, range 36 east, where it is returned to the river. The length of the pipe line is about 7 miles. The location of the power plant is not located on the map (Washington Exhibit 17). I am not sure of the forty which it is in and therefore I can't locate it exactly, but they show the pipe line and at the end of the pipe line, approximately, is the power plant.

In section 22, township 5 north, range 36 east, the city of Milton diverts water from the South Fork for power use in section 18, township 5 north, range 36 east. This water is conducted to a standpipe on the hill above the plant referred to as the new Milton power plant, from which it either spills directly back to the river or is conducted through the turbines of the power plant. From the power plant the water may return di-

rectly to the river, but part of it enters a tail race of the power plant, from which by a wood-stave pipe it is conducted to what is called the old Milton power plant in section 12, township 5 north, range 35 east.

The Milton city pipe also takes its supply of water at the Milton power plant. That is the new power plant. The Milton city pipe for municipal purposes has its intake at the new Milton power plant.

A short distance below the new Milton power plant is the mouth of Couse Creek, which I have already mentioned as being during the low water season not significant.

A short distance below the mouth of Couse Creek is the intake of the Milton Ditch. The Milton Ditch diverts from the river by means of a dam constructed of logs or rocks or such materials as are on the site, and flows for maybe a hundred yards to the intake of a pipe line, at which point some water from the Milton Ditch spills back into the river.

The Milton Ditch water is conducted through about two hundred feet of this pipe line, crossing under the power line from the new Milton power plant to the old Milton power plant and emerging in an open ditch which flows along the southwest wall of the canyon, with some small turnouts for irrigation a short distance below this end of the pipe line, and then the ditch flows away from the southwest side of the canyon out into the more open lands, and there are between the head of the Milton Ditch at the river and the northwest quarter of the southwest quarter of section 12, township 5, range 35 east, there are between those points several small diversions.

This stream in that course has through part of its distance the appearance of being a natural channel; through other parts of that distance, however, it has the appearance of having been artifically constructed or improved or worked upon.

In that quarter-quarter section just mentioned of Section 12 the Milton Ditch makes an abrupt turn to the left and at that point there is a spillway running from the Milton Ditch to what is known as the Miller headrace, which takes off of the Walla Walla River at the bridge which is locally known as the Up-the-River Bridge, in the northeast quarter of the southeast quarter of section 12, township 5 north, range 35 east.

Just below the point on the Milton Ditch where this spillway leaves to join the Miller millrace is a measuring weir, which is about one mile by ditch from the intake of the Milton ditch from the Walla Walla River, and in that mile are several diversion turnouts. And from the weir the Milton Ditch flows through the City of Milton and irrigates lands as far west as the center of section 3, township 5 north, range 35 east.

We will return now to the water which came from the Walla Walla River by the way of the new Milton power plant, and that which is diverted from the Walla Walla River through the Miller millrace. Those two flows join and from that combined flow there are two diversions and a return to the Walla Walla River. The two diversions are the Miller mill flume and the McIntyre Ditch. The Miller mill flume conducts water to the Miller mill, shown on the map in the southwest quarter of the northeast quarter of section 12. From the Miller mill the tailrace conducts this water to the Little Walla Walla

River, which leaves the Walla Walla River at the Red Bridge, so marked on the map.

The water of the Miller millrace does not, therefore, return to the Walla Walla River, because the cross connection shown below the Miller millrace at all times at which I have been there, of which there have been a good many, has been dry.

The water then from the Miller millrace joins the diversion into the Little Walla Walla River and proceeds as Little Walla Walla River (water) from that point.

My second mark on the map (Washington Exhibit 17) was the cross connection from the Little Walla Walla River to the Walla Walla, which I have shown dry. It is indicated on the map.

At this point the following occurred:

THE SPECIAL MASTER: And that is in what color? A. I have been making these marks in red. Is that all right?

THE SPECIAL MASTER: Yes, so that all marks made upon the map are not a part of the exhibit; it merely illustrates the testimony and it may be considered testimony. The Doctor's marks are red, and we may then permit opposing counsel to use a designating color of their own.

The witness resumed (330):

I mark that because the map as it is shown here indicates a considerable stream of water, by width of line indicates as much water flowing there as in the Walla Walla River or in the Little Walla Walla River, while actually during low water periods at all times at which that has been investigated that cross connection is dry and there is no flow.

Between that point and what is called The Frog there are a number of diversions from the Little Walla Walla River. These are by small ditch or by water wheel, and there are also two rather important ditches which take out in that reach, called the Stillman Ditch and the Perkins Ditch, which will be mentioned later.

Returning now to the main Walla Walla River, from which the Little Walla Walla River has obtained water by direct diversion and through the Miller millrace, the main Walla Walla River flows north from that point, with a few small diversions, to the bridge called the Nursery Bridge. At that point concrete headgates divert water, when there is water available, for the Hudson Bay canal. I will mention that later and connect it into the general flow.

The main Walla Walla River channel then goes to the north from that point with very little diversion therefrom to the state line.

The Little Walla Walla River, as I mentioned, is now brought down to the position, to the point, known as The Frog. At this point the Hudson Bay intake joins the Little Walla Walla River and their waters mingle in the same general channel. That is the Hudson Bay intake from the main Walla Walla enters the Little Walla Walla River and that becomes the channel for the Hudson Bay for a distance of possibly a hundred feet. The (Little) Walla Walla River just above the entrance of the Hudson Bay water passes partly through the Peacock Mill. Water is diverted for the Peacock Mill from the Little Walla Walla River, goes through the mill and is returned to the Little Walla Walla River at approximately the point where the Hudson Bay canal enters the Little Walla

Walla River. There are, therefore, flowing into The Frog three sources of water, the tailrace of the Peacock Mill, the water which is left in the channel of the Little Walla Walla River, and the intake of the Hudson Bay canal from the Tum-a-lum. The Peacock Mill is not located on the map.

The Tum-a-lum is that stretch of the Walla Walla River in Oregon locally called the Tum-a-lum. The Frog has an artificial method of distribution of water in the form of concrete structures. The Frog is so named because there are three streams feeding in and as many as nine streams feeding out. Naming them in general from east to west, the streams leaving the Frog (are) the Crockett Branch (being) the most easterly division, the Ford Branch (being) the center division and the Hudson Bay canal (being) the most westerly division.

Now, in turn, the most easterly division, the Crockett, divides just below the Frog into two parts, one called the East Crockett branch, the other called the West or Main Crockett branch, shown on the map.

From the middle division, or Ford branch, there takes off a short distance below the Frog to the left the Pleasant View-Powell canal.

The other, westerly division, the Hudson Bay canal, flows away from the Frog without division.

At the Frog are also three orifices which divert a small amount of water for land immediately adjoining the Frog, which are not in any way main diversions; they are merely individual irrigators, merely orifices, or a weir for local diversion.

I will repeat, the main streams flowing out from the Frog are the east branch of the Crockett, the west or main branch of the Crockett, the Ford branch, the Pleasant View-Powell canal, and the Hudson Bay canal.

The East Crockett branch turns at right angles from the Main Crockett, and through most of its course it follows fence and property lines and road lines, making right-angle turns, apparently mostly artificially constructed.

The West or Main Crockett branch flows through a good part of its course in what appear to be rather natural channels, although within the last year a quarter-mile north of the center line of section 35 the Main Crockett channel has been revised to form a straight line across at least a forty-acre tract to avoid a winding, more natural appearing channel in which it flowed last summer and the summer before.

At the center line of section 35 the west branch of the West Crockett leaves the West Crockett to the left, and flows in a northwesterly direction to the center of section 26, whence it flows westerly and does not rejoin the west branch of the Crockett.

This channel through part of its length has the appearance of being rather a natural stream, but through the lower reaches is on property lines and makes right-angle turns.

At the south edge of section 26 another branch takes off from the West Crockett to the left; it is called the West Branch Crockett. This branch, the West Crockett and East Crockett channels, are united about one-quarter mile north of the center of section 26 and from there the

combined channels conduct water to the channel which is known as the East Prong Little Walla Walla Spring Branch, marked on the map "East Prong Spring Branch."

From there the water flows through a region in which there are springs and seepage waters through the state line, at which point it becomes known as the East Little Walla Walla, and from that point flows to join the Walla Walla River in the northeast quarter of the northeast quarter of section 10, township 6 north, range 35 east.

Returning to the Ford branch, at the Frog, that is the middle of the three divisions of the Frog, the Ford branch after the Pleasant View-Powell ditch leaves to the left, flows in a northwesterly direction across sections 35, 26 and 27. At the south edge of section 26 a channel is shown diverting to the right from the Ford branch and joining the west branch of the West Crockett at the center of section 26.

The Ford branch and the West Branch of the West Crockett flow northerly and westerly across sections 26 and 27—across the north half of sections 26 and 27—and are united then in the head of the channel known as the West Prong of the Little Walla Walla River.

This channel flows then through an area of springs and seepage to the state line, at which point it becomes known as the West Little Walla Walla River and flows into the Walla Walla River in the Whitman Mission Donation claim, as shown on the map.

I have mentioned now the three streams which conduct water, at least during the season of heavy flow of

the Walla Walla River. Those three streams conduct water into the state of Washington from the surface supply of the Walla Walla River in Oregon.

Below the fringe of the gravel delta are these regions of springs and seepage which I will mention in connection with the flow of those streams.

There are two distinct spring branches in there, so-called, which have their source throughout the entire year in springs, and which also flow northerly into the state of Washington across the state line. Those are known as the Big Spring branch and the Little Walla Walla or Ballou Spring branch.

The Big Spring branch conducts water throughout the year into the state of Washington, as far as I have observed.

The Little Walla Walla or Ballou Spring branch is mostly used for irrigation in Oregon, but it supplies some water to the state of Washington through the Hoffman ditch, which was mentioned yesterday or the day before yesterday.

Those are the sources of water flow across the state line into the state of Washington.

Reading from east to west: The Walla Walla River, or Tum-a-lum; the Big Spring branch, and the group of ditches which take out of the Big Spring branch in Oregon for diversion into Washington; the Little Walla Walla Spring branch through the Hoffman ditch; the East Little Walla Walla River, and the ditches which take from that river to conduct water into the state of Washington; and the West Little Walla Walla River and the group of ditches which take water from that stream in

Oregon and conduct the water into the state of Washington.

Below the point where the East Crockett, the Main or West Crockett, and the West Branch of the Crockett, rejoin to flow into the East Prong, the carrying capacity of the combined channel was about at its maximum on December 10th last winter, and the measured flow, measured by current meter, was about twenty-five cubic feet. per second.

The Ford branch, just above the point where it enters the valley of the West Prong, was measured on September 30, 1933, and showed a flow of approximately twenty-six cubic feet per second at that point,—that is not the entire capacity full bank flow.

The Crockett branch when it was measured had twenty-five second feet, and was full bank flow, and some slight amount was just oozing out of the top of the bank, so twenty-five second-feet is the approximate present capacity of the Crockett channel at a point after the three branches of that Crockett channel recombine. In other words, it is the maximum capacity at present of the Crockett channel entering the East Prong, while the maximum capacity of the Ford channel entering the West Prong is more than twenty-six second-feet, and is probably in the neighborhood of forty second-feet.

Measurements of the Walla Walla River in Washington were also conducted in order to determine the amount of the seepage gain of the Walla Walla river from the state line to the lower end of the project.

These measurements were made at different times during the summer of '32, and the data which we have

also permits computation of the seepage gain in the first four miles of the Walla Walla River channel in Washington for 1933, and in the total eighteen miles, approximately, of the Walla Walla River channel in Washington at five different times in 1932, showing the amount of seepage gain in that reach of the channel.

This survey was made by measuring all tributary flows that could be measured and all diversions, and by measuring the flow of the river itself at various points in that distance.

Then a computation by means of tributary flow, the subtraction of the diversion flow, indicates the non-visible flow into the river, which was called the seepage gain in that stretch of the river.

Now, with that rather detailed description of the river I can stop until another phase (339).

I will take up now the figures on the available supply of the Walla Walla River during the summer.

Stream gauge stations have been maintained on the Walla Walla River and its forks from time to time since about 1904 or 1903, by the United States Geological Survey in cooperation, I believe, with the state of Oregon, published in water supply papers of the United States Geological Survey, photostat copies of which are included in the hydrographic data, Exhibit No. 18.

So that the figures which I give here are taken directly from that data, and are merely my arrangement and computations on those figures.

Between 1903 or 1904, when measurements were started, as far as the records show, and 1917, the stations of which records were obtained were distributed at

various places along there, and it appears to me from studying the records that they cannot be used very well in connection with records since 1918 to indicate the flow of the river, because the stations were intermittent. The records are admitted in the descriptions written by the U. S. Geological Survey to be not always accurate or reliable,—gauges were washed out,—and I have therefore confined my computations to the period from 1918 on, that is, the last sixteen years on the river.

Moreover, the record for 1929 can not be used, because the Milton power plant was diverting water in that area past the gauge in amounts which are not known, since they were not accurately measured. Estimates were made, but the estimates are not shown in the U. S. G. S. water supply papers; and the year 1929, as far as I could determine, can not, therefore, be used.

It is my opinion that the sixteen years from 1918 until 1933 is such record as contains within its limits the variability of the river from its normal (flow). That is why I used those years, because they do show correctly the variability of the flow of the river in the summer months.

The stations which were used were not the same stations, however, all that time. From 1918 to 1928 the station was used which was about one-half mile below the confluence of the north and south forks, and was numbered I believe station 212, and will be referred to in that manner.

From 1930 to 1933 the stations which were used in this compliation are stations numbered 215 and 216.

Station 215 is on the South Fork about a mile above its mouth.

Station 216 is on the North Fork at the Road Bridge, about one-half mile above the mouth of the fork. These stations are, therefore, on a stretch of the river, so that measurements were made for eleven consecutive years just below the forks, and for the last four consecutive years just above the forks.

Now, the measurements from 1918 to 1928, therefore, can be averaged directly, I consider, with the records from 1930 to '33, particularly because a survey of the stream in that section in 1932 showed that the water which was diverted for irrigation between those two locations was very nearly equal to the return, that is, to the tributary flow, in that region, so nearly equal as to make it appear reasonable to average the eleven years of records at the lower station with the four years of records at the upper station, and that gives a total of fifteen years of records during the summer months, which indicate a very reliable average, particularly the variation of flow during that period.

Table 1, therefore, I will refer to at this time. This table shows the year, shows the station at which the records were obtained, and shows for each month of the summer, June, July, August and September, the mean flow in c. f. s., and the variation from the mean for that period.

This record shows that in general the years from 1918 to 1922, inclusive, and the year 1933 were years in which the flow of the minimum month of August was above the average for the 15-year period, while the years from 1923 to 1932, inclusive, showed a flow which was less than the average for the 15-year period. The year in

which the August—which is the minimum month— in which the August flow was the largest was 1922, when the flow was 132 c. f. s. The August flow was a minimum in 1931 with 75.7 c. f. s., a variation of approximately 56 second-feet from the highest flow shown in August, that is, the highest mean flow shown in August, to the lowest mean flow in August in that 15-year period.

The critical period in regard to irrigation water in this project, which is without storage, is the summer period of July and August and the first part of September.

The average for July over this 15-year period is 111.6 cubic feet per second, or otherwise known as second-feet—I refer to them indiscriminately.

The mean flow for August over the 15-year period is shown to be 100.2 c. f. s., and the mean flow for September during that period is shown to be 110.8 c. f. s.

These two stations, therefore, indicate the supply of irrigation water at that point and its fluctuation since 1918.

I might point out that the variation in flow in June, the fluctuation of flow in June, does not follow exactly the fluctuation of the flow in August. The things which affect that fluctuation are the amount of snowfall in the mountains and the rainfall during these months. That is, a heavy rain in September, for instance, 1927, in September, a month of heavy rainfall, brought the mean flow for that September up to 39 c. f. s. above the mean for the period, while all other Septembers since 1922 have shown less than the mean flow for the period.

I point that out to show the effect of precipitation during any one of these months on the flow.

During the earlier part of the summer the flow is affected by the snow conditions in the mountains, by the temperature conditions as to rapidity of melting, and by the rainfall occurring in any particular month in addition to the melting snow.

Coming back to June, therefore, the variation in the fluctuation for June is not just the same as for August. From 1918 to 1920, inclusive, the flow in June was below the average by considerable amounts. From 1921 to 1923, inclusive, the flow in June was above the average. From 1924 to 1926, inclusive, the flow in June was below the average for the period. In 1927 the flow in June was above the average for the period. From 1928 to 1931 the flow in June was below the average for the period. In 1932 and 1933 the flow in June was above the average for the period, and 1933 shows the greatest amount of these 15 years of records by which the flow in June exceeded the average. The flow in June, 1933, was 210 c. f. s. above the average of 231.5 c. f. s., a very heavy flow this past season in June, diminishing, however, rapidly through July to the August flow, which was only slightly above the mean for the period in August, and dropping then to September mean, which was below the mean for September for the period, showing that although there was a heavy flow in June, that flow diminished rapidly at the forks to less than average flow in September.

I will take up now the division of my work which deals with the administration and the use of irrigation water in Washington and Oregon during the low water period of 1933 (345).

After July 22nd, 1933, according to testimony by the Washington Water Master,—by the Walla Walla County Water Master,—Washington rights on the related stream system—which I will explain later what I mean by related stream system—Washington rights on the related stream system subsequent to 1892 had to be closed in order to make water available for prior rights on the related stream system. It appears that all prior rights were thus supplied, except that there was a shortage of water for the Gardena tracts, and some lands on the East Little Walla Walla above the mouth of the Big Spring Branch were also short of water in 1933 for part of the summer.

The period of closing of the rights subsequent to 1892 was from July 9th to 22nd. From July 9th until after the last of August may therefore be called the critical low water period.

The stream records which are available from our work in 1933 show the amounts of water which is flowing in various parts of the project in both Washington and Oregon and permit the computations of the gross duty of water in the two states.

First, the duty of water in Washington: Now, we refer here to Table 2. Now, the points of measurement of the available supply: We had the staff gauge on Mill Creek below Blue Creek during the period of minimum flow in 1933, and the records for Mill Creek below Blue Creek are taken from the statement of the flow in Mill Creek given in Hydrographic Data, Washington Exhibit Number 18. I have computed the flow at ten-day intervals after the period at which Washington rights subsequent to 1892 had to be closed, in order to show the

succession of flow conditions throughout the summer, throughout the critical low water periods after that time. The dates are, therefore, July 22nd, August 1st, August 11th, August 21st, and August 31st.

The flow of Mill Creek below Blue Creek is shown in Table 2, the data being derived directly from Hydrographic Data, Exhibit 18, with the exception of August 31st, which was assumed to be the same as the flow on the last date of record, about a week earlier. There was no precipitation in that time, and the flow was assumed to be continuous, as it had been practically continuous for a month before that time.

The first row of figures, therefore, shows the flow of Mill Creek below Blue Creek.

Another source of supply for the lands irrigated in Washington is the return from the City reservoir, which flow fluctuates greatly during the day and hence cannot be very efficiently used for irrigation. It can be used, but not very efficiently. The return from the City reservoir was computed by subtracting the city water consumption from the diversion at the City intake. The records of diversion and consumption are given in the Hydrographic Data.

The weir at the intake was checked during the first week in August by Mr. Douglas and myself under my direction and the head was established, so that we could know the discharge over the weir. The records were kept of that discharge and are given in the data.

This weir was not in at the period of July 22nd for the first computation, so that the flow at that time was assumed to be the same that it was on August 4th, when

the measurements at that point were started, 27 cubic feet per second.

That gives the second row of figures, then, the return from the City reservoir, which is added to the supply of water for the irrigated acreage, and all these flows are in mean cubic feet per second for that date.

Below the City is return from the sewage disposal plant, which runs very steadily, as shown in the data, at 5 cubic feet per second and is added to the supply of irrigation water available for Washington lands.

Now, around the fringe of the gravel delta in Washington are numerous springs which contribute water to the stream system. There are on a good many of those springs irrigated acreages with rights sufficient to take up all the water of those springs, with priority dates such that they do not have to be closed off to supply water to the other subsequent priorities on the,—to priorities on the lower Walla Walla River. Those springs I have excluded from the list of the springs contributing to the related stream system later in the report, but I have included all of them in this part of the report to show the available supply of those springs. The flow of those springs is shown in the Hydrographic Data.

The flow is measured at two different times. It was measured by Mr. Humphrey in August of 1932, and was measured also in October of 1933. Those are measured mostly by current meter.

The sum of the flow of the springs is shown in the data to be 14.02 c. f. s. in August, 1932, and 17.55 c. f. s. in October, 1933.

Now, 1933 was a somewhat wetter year than 1932. Moreover, the period in August is usually the minimum flow period, not only for the main Walla Walla River and Mill Creek, but also for the springs, which fluctuate in their flow very closely with the Walla Walla River and Mill Creek. For that reason I have interpolated between these flows approximately 17 c. f. s. in October, 1933, and 14 c. f. s. in August, 1932, to obtain the flow of these springs at the periods at which I made the computation for Table 2, and have assumed that on July 22nd and August 1st the flow of the springs, the combined flow of the springs, was 16 c. f. s., while on August 11th, 21st and 31st it was 15 c. f. s., the typical variation being the decrease through July into August.

Those figures cannot be far off, because there is not much fluctuation in the flow of those springs, and we have two periods, two different periods, of measurement.

The fifth source of irrigation water in Washington is the flow across the state line from Oregon into Washington.

The daily discharge records for 1933 are included in the Hydrographic Data, which show the total flow from Oregon into Washington across the state line at each of these dates, and by total flow across the state line I mean the flow in that part of the project which is included in the related stream system as far as the investigation of these irrigation rights is concerned. It does not include the flow on the western end of the alluvial fan in Oregon. We get, therefore, the total available supply of irrigation water in Washington at those five periods, after rights in Washington subsequent to 1892 had been closed. I sub-

tracted from that available supply the Gardena diversion, as indicated on those dates.

Now, the Gardena diversion figures given here are not exactly the diversion figures listed on the sheet entitled "Gardena Canal at intake" in Hydrographic Data, because some of the water which is turned down the Walla Walla River at that point is Gardena water which is turned down to lower users who by court decree have priority over Gardena, therefore, the Gardena diversion which is given here includes the number of cubic feet per second turned down the river which is actually Gardena water. That explains any discrepancy that may be noted between this Gardena diversion and the daily discharge records of the Gardena Canal. That gives, then, subtracting the Gardena diversion, gives the available supply for lands on the project in Washington which are irrigated by that supply. Part of my work has been to tabulate and compile the rights in the decrees of both states on the basis of priorities, on the basis of the stream systems, and in Oregon on the basis of the individual ditches. From that tabulation I have reached the figures given in Table 2 showing the acreages which are irrigated in Washington on each of the six main streams with rights prior to 1893. The total acreage is 4985.53 acres.

By order of court decree there are some acres which are irrigated on Mill Creek with rights subsequent to 1892. This acreage totals 472.93 acres.

The total acreage irrigated in Washington, therefore, by this supply of water is 5458.46 acres. This includes rights by decree prior to 1893, and also these rights which are irrigated subsequent to 1893 by court order, but does not include Gardena.

From that available supply and from that acreage irrigated by that available supply I compute an average duty of one second-foot to approximately 95 acres.

That is during the period from July 22nd to August 31st, inclusive. That is the average duty. It varies somewhat up and down, but it averages over that period of time that amount.

In that computation, I have taken this acreage on the theory that on July 22nd it was still all in crop and all requiring irrigation. These figures are based—the duty is based on the total rights; available water and land susceptible to irrigation under the decree.

I will take up next the Table 3, which shows 1933 water supply conditions on what I call Part 1 of the project in Oregon, for the same dates for which I have already computed the same thing in Washington. The particular method of administration in Oregon made it advisable, for the purposes of this tabulation, to divide the project into these two parts, which do not, by the way, include all the irrigated area in Oregon, but which are parts on which the duties of water could be reasonably computed from the data available.

They are typical areas, which cover most of the area irrigated by decree in the state of Oregon. I have made the same assumptions (regarding the available water and land susceptible to irrigation under the decrees and permits) that I made on the Washington side.

Part 1 of the project, therefore, I will take up first, in Oregon (352).

All of the water flowing in the North and South Forks of the Walla Walla River was during 1933 regu-

larly diverted and used for irrigation before reaching the centers of approximately sections 25, 26, 27 and 34, which are the outer edges of the gravel delta north and northwest of Freewater.

Therefore the available supply distributed over the acres which have rights by decree below that point to the upper fringe of the gravel delta was my general method of computing the duty of water from that point.

The records of flow in the south fork and north fork were taken at the gauging stations which have been maintained on those forks, the record of the south fork showing available supply above all irrigation was obtained at station 214, which is referred to sometimes as the U. S. G. S. station No. 214, which is above all irrigation of the south fork.

There is no station above all irrigation in the north fork, so we used the state cooperative station referred to here by letter "B" near the mouth of the north fork. Referred to on the map as letter "B". The combined flow at those two places represents the available water supply for points below.

I also, for the purpose of including all areas below the head of irrigation on both forks, made an estimate which I believe is reasonably accurate of the consumptive use of water on the north fork, and have included that estimated consumptive use of the north fork with the combined flows of those two stations to indicate the flow available for irrigation below the heads of irrigation of both forks.

The studies of the measurements which I have made in 1932 and 1933 indicate that this consumptive use in the north fork is approximately five c. f. s.

Measurements in 1932 showed a total diversion on the north fork on July 26, 1932, of 9.5 c. f. s.

And on August 25, 1933, showed 10.0 c. f. s. total diversion on the north fork.

There is, however, some gain in flow of the stream through return from that irrigation. Its amount can not be stated exactly, but I assume it was reasonable to take the flow of half of the total diversion as return flow,—and the figure is small in any case—so I used 5 c. f. s. for consumptive use in the north fork at the station 216.

The total flow from the three sources, south fork station 214, north fork 216, plus the estimated use in the north fork, gives the available water supply for part 1 of the project in Oregon as far as gauging station records can indicate.

The tabulation of rights in the Oregon decree indicate that the total acres by decree with rights prior to 1910, except the Hudson Bay Company, which does not divert water during its low water period, and Couse Creek, in which the flow is negligible, total 3140.051 acres.

Distributing the available supply over that computed acreage shows an average use of 1 c. f. s. to approximately twenty-six acres, and that is fairly steady through this low-water period.

It is my observation during 1933, as far as I could tell from a study of adjudication map of the state of Oregon and study of the decree, and general inspection on the ground, that during 1933 all rights by decree, that is, prior to 1910, obtained irrigation water.

If all of the rights by decree prior to 1910 did not obtain irrigation water, the duty of the remaining acres

was lower than 1 c. f. s. to twenty-six acres. If more rights obtained water from this supply, rights were being irrigated which were subsequent to 1909 when the decree was completed.

One right I should mention in this connection, the right of the city of Milton for the diversion of 7.24 c. f. s. which is not mentioned in this table. I have no figures of the amount of water which the city of Milton was diverting. I know the population of Milton by the last census, and as stated in the report of Mr. A. M. Piper, I believe, also, is less than two thousand population. I assume, therefore, that the return or the tributary flow of which there is some below the points of measurement of the gauging stations, a tributary flow which has been measured as in excess of four or five cubic feet per second a short distance above the Milton City water supply, and on the forks, would supply this city supply, and therefore would not need to appear in this tabulation. But if that return flow or gain or tributary flow does not directly enter the Milton supply, it compensates for it on lower rights.

The purpose of this tabulation is slightly different from a later tabulation in which I did use the same basis of computation in estimating the available supply in Washington in connection with the city of Walla Walla. This is for the purpose of showing available supply. The latter is for the purpose of showing possibilities of surplus.

In support of this computation of duty of water on this part 1 of the project in Oregon I will refer to table 4.

The records in table 4 of the stream flow are taken from hydrographic data, Exhibit 18. Table 4 shows the

total acres served on each of eighteen different diversions in Oregon obtained from my study of the Oregon decree, and study of the Oregon state adjudication map, and in cases in which I was in doubt, inspection in the field to ascertain where water was obtained.

I have also computed from the Oregon decree and the stated rate of maximum allowable diversion in Oregon as stated by the decree the diversion which those acres under each ditch are entitled to by the Oregon decree. I then used for each of July and August the mean flow in each of those ditches and the amount by which, if any, that flow was in excess of the maximum amount allowed for those acreages by the Oregon decree.

These results show that on 2587.266 acres out of the 3140.051 acres previously mentioned on part 1, which constitute the total acreage of part 1 by Oregon decree, the maximum allowable diversion by decree is 100.28 c. f. s.

The actual total diversion in these ditches in July as shown by a summation of the data given in the hydrographic data was 123.95 c. f. s., and in August was 113.07 c. f. s.

One ditch in July and three of the eighteen ditches in August were not carrying water in excess of the amounts allowed—the maximum amounts allowed by decree. All the rest of the ditches in July and August were carrying water in excess of the maximum amounts allowed by decree.

I may say, in regard to the points of measurements of these ditches, most of the records filed included in the hydrographic data are records kept by the state of Orego and agreed upon between the two states, and that

in the ditches which I personally supervised measurements in are also in the data. The measurements in the ditches were made as near as possible to the first turn-out from the ditch; they were not made directly at the river, because in some cases the ditches flow parallel to the river for considerable distances, and there is a possibility of direct return through the bank to the river; therefore I made the measurements as near as possible to the first turn-out from the ditch.

The figures shown here, therefore, are the amounts of water which are diverted for the lands with rights under each of these ditches.

The total amount of diversion of these eighteen ditches—the average diversion through July above the maximum amounts allowed these ditches by decree, was 25.20 c. f. s., and in August the average amount above the maximum amount allowed these ditches was 14.79 c. f. s.

Reduced to percentages the records show, therefore, in July 25.1 per cent, and in August 14.7 per cent more water being diverted for irrigation in this part of the valley than the maximum allowed by decree. And that was measured on eighty-two per cent, the ratio of the acreage under these ditches to the total acreage in that part of the project—eighty-two per cent of total area on that part of the project.

If the same amount of over-diversion pertains on the other eighteen per cent of the acreage irrigated on that part of the project by decree—or with rights by decree, the total diversion is found to amount to more than the combined flow at the gauge stations, which indicates clearly to me that there is gain in flow of the river below

the gauge stations, and that the gauge stations do not represent the entire available supply for irrigation.

Part of the ditches measured were in the canyon above noted; considerably the larger part of the acreage was from the Milton ditch down, however. Only about one-sixth of the total acreage was above the Milton ditch, five-sixths of the total acreage was below the Milton ditch.

There is somewhat more chance for gain in the river from direct return from irrigation above Milton than below Milton. Moreover, below Milton the diversions with the exception of the east side ditch, are all to the west from the Walla Walla River or Tum-a-lum, and therefore directs the water away from the eastern end of the alluvial fan from which the ground water flows out to supply rights in Washington.

I also studied a section of the project including 1143.77 acres on the so-called Spring branches just above the state line in Oregon. Points of measurement were established and maintained through the summer of 1933 which shows the flow in those spring branches at certain points below the gravel delta. The flow was also measured at the state line. So the difference in flow indicates the amount of water used in that section, approximately.

The points of measurement were on the Big Spring branch, on the Little Walla Walla or Ballou Spring branch, and the diversion from there, on the East Prong Spring branch and the diversion from there, and on the West Prong Spring branch, all measurements being below the heads of the Spring branches far enough down so that the chief seepage areas and springs were above the points of measurement; we could not include all the

water seeping into those springs; there is no way to measure it where you can determine the exact amount of water flowing in those springs.

There is probably some additional seepage below these points of measurement, because those are gaining streams below the points of measurement, so if there is any change in the available supply it is a gain due to seepage below the points of measurement, and if there is any variation from these figures it would be in the nature of an increase in water supply rather than less than shown here.

The total flow of the Spring branches is given; the flow at the state line is subtracted, showing the water used in that part of the project in Oregon from approximately the centers of sections 22, 23 and 24 to the state line.

I computed the acreages having rights by Oregon decree and also a permit right for two hundred and eighty-eight acres subsequent to the decree and which from appearances was irrigated in 1933, the total acreage is as previously stated, 1143.77 acres.

Distributing the available supply used on that acreage into those acreages shows a gross duty on that part of the project, varying as the season advances,—increasing, I should say,—increasing as the season advances, on July 22nd a duty of 1 c. f. s. to approximately sixty-three acres; on August 1 a duty of 1 c. f. s. to approximately seventy-one acres; on August 11th a duty of 1 c. f. s. to approximately seventy-six acres; on August 21st a duty of 1 c. f. s. to approximately eighty-two acres; on August 31st a duty of 1 c. f. s. to approximately eighty-eight acres.

The sources of the stream flow data are given in the hydrographic data.

That completes my survey of the actual use of water in 1933 based on the assumption that rights by the individual decrees of the two states were irrigated at that time, as brought out by the administration testimony, which has already been given in Washington, and on the assumption that all rights in the Oregon decree were irrigated.

The stream flow data which we have permits now a computation of what would happen if the Walla Walla river project, including Mill Creek, should be administered regardless of state line and rights closed off in their respective priorities on all streams in the related stream system, that is, on streams in which there is water to supply later rights. There are small streams through here in which the early rights take up all the flow, and those are what I call the non-related stream system. They are, however, the main streams which have water for later rights, or would have water for later rights—which I call the related stream system.

To show what would have been the effect, then, in 1933, in 1932 and in 1931, of such administration, regardless of state line on the number of acres which could have been irrigated, or which were irrigated in the two states, I made a computation of the surplus which would have resulted from closing all rights in Oregon subsequent to 1892 at the same time that such rights were closed in Washington.

The surplus thus obtained was distributed among the lands with subsequent rights in the two states on the

basis of priority and in accordance with the separate decrees.

Now, since the rate of use of water in Oregon affects not only the amount of the surplus but the extent of its distribution, I have made this computation on the basis of three different rates of use of water on the Oregon lands.

The first rate I have used is the maximum rate specified by decree, which in general is one and one-half miner's inches, or .0375 cubic feet per second per acre of land. The average,—I should point out in this connection the average duty allowed—the average maximum rate of use of water allowed by the Oregon decree is in excess of one and one-half miner's inches per acre, because of the provision in the decree that tracts of land over half an acre and less than one acre shall obtain one and one-half miner's inches of water, and tracts of land of half an acre or less shall obtain one inch—one miner's inch of water.

There is also a stock water right for 50 miner's inches of water which I have included, with no acreage corresponding to that right. For these reasons, the average maximum allowable use of water in Oregon by decree is somewhat in excess of one and one-half miner's inches per acre.

I use a miner's inch as one-fortieth of a second-foot. I have written into the record .025. The second rate for use of water in Oregon on which I based this tabulation is one and one-quarter miner's inches, which is .03125 c. f. s. per acre. This rate of use amounts to approximately one and seven-eighths acre feet per acre

per month, which if applied during the two months of July and August would amount to two-fifths of a seasonal total of about nine and one-half acre feet per acre.

I may point out in that connection that on the Sunnyside Project the indication is that two-fifths of the total seasonal supply is used in the two months of heaviest irrigation, which is why I have used two-fifths in that case.

The third rate of use in Oregon which I have used is one miner's inch, or .025 c. f. s. per acre, a rate of use which amounts to about one and one-half acre feet per acre per month, or a total depth of water of ten and one-half feet if used continuously at that rate through a seven-month season.

In this tabulation the rate of use of water in Washington was assumed to be one c. f. s. to one hundred acres, or four-tenths Oregon miner's inches per acre.

I refer now to Table 6, which shows for each of the three years 1933, 1932 and 1931 the amount and distribution of the surplus which would hypothetically have been created by closing Oregon rights subsequent to 1892, and shows the distribution of that surplus to Oregon and Washington lands with rights subsequent to 1892, as far as a surplus can be made to extend.

I have computed that surplus and distribution of surplus for each of the dates which were used in previous tables, representing the periods after Washington rights in 1933 were closed, July 22nd, August 1, August 11, August 21 and August 31.

The computation of available supply and surplus in Part 1 in Oregon was computed by combining the meas-

ured flows at gauging stations 214 and 216 and subtracting therefrom the requirements of the lands with rights to that flow prior to 1893 at each of the three rates of use before stated.

The same system was followed in Part 2 of the project in Oregon, and the total surplus shown is the combination of the surplus from Part 1 and the surplus from Part 2.

Now, the surplus thus computed does not represent, in my opinion, all of the surplus which would be obtained from Oregon by such closing of rights, because there are other sources of small amounts of water supply and there are other acreages which were not included and cannot be included with any accuracy in such a tabulation, but which would provide if closed off and which would augment the surplus here shown. These sources are rights on the North Fork, which were not included in this tabulation, springs and seepage return flow in the canyons above Milton and below the gauging stations used in the computation, springs and seepage return and gain on the four main spring branches in Part 2 between the points of measurement and the state line, from the upper reaches of these spring branches above the points of measurement, some additional surplus probably from the Lower Tum-a-lum, and probably also from Couse Creek.

There are six sources from which there would probably be some addition to the surplus which is here computed. The tributary flow from springs in the canyons above Milton were measured in 1932 at approximately a total of around four or five c. f. s. That much is

definitely additional. These other sources of supply would contribute further to the surplus.

There are, on the other hand, natural conveyance losses in the reach from the gauging stations to the state line. Since there is a considerable gain which is not represented in the surplus, and since, on the other hand, there are conveyance losses, it was considered fair and reasonable to assume that the gain in flow offset the conveyance losses in those reaches, and they were both, therefore, left out of the tabulation.

That explains, I believe, the computation of the available surplus (365).

Next, the distribution of that surplus among acreages which have rights subsequent to 1892: The amounts of the surplus are shown in the three pages of Table 6. From that surplus is subtracted, first, the Gardena shortage, because as conditions were in 1933 Gardena was somewhat short of water throughout this period and their priority would be filled first. The Gardena shortage was, therefore, subtracted to show the amount of water which would be available for distribution on other than Gardena lands in Oregon and Washington, and the figures given under the line "Remainder for Distribution" are the figures which are, therefore,—are the amounts of water which are, therefore, distributed among Washington and Oregon acres in this tabulation with rights subsequent to 1892.

The conditions, then, in 1933 were such that if the Walla Walla River project had been administered on the basis of the decrees of the two states, regardless of stipulation, and with the rate of use in Oregon on the

basis of the maximum allowed by decree, on July 22nd 614 acres in Washington would have been supplied with water which were actually in 1933 at that time closed off, and in Oregon 485 acres with rights subsequent to 1892 would have been supplied with water, and the remainder, of course, of the Oregon acres, if any, during 1933 which were obtaining water with rights subsequent to 1892 would have been deprived of water.

As to the reason for my assumption that the shortage of Gardena should be made up is that there was practically no shortage of other irrigators of equal priority in the State of Washington. A few acres on the East Prong later in the summer were short but the number was so few that I disregarded it. Gardena was practically the only shortage among the 1892 rights. On the Oregon side, I assumed the rights of Oregon continually flowing, of 1892. I did not compute any surplus as derived from Oregon rights of 1892. In other words, on both sides of the state line the only shortage among 1892 rights is Gardena. The surplus, therefore, created by closing off rights subsequent to 1892 would be applied, first, to the 1892 shortage, which was Gardena, then the excess after the Gardena right was filled would be this remainder for distribution, which would be ordinarily distributed and prorated among lands of both sides of the state line in their respective priorities and by those various rates in which the computation was made.

Now, a comparison of the time of the summer, first: The computation shows that in 1933 there would have been water available to irrigate additional acres in Washington with rights subsequent to 1892, and in

Oregon with rights subsequent to 1892, on July 22nd, August 1, August 11 and August 31, while on August 21 the Gardena shortage would have taken all of the available surplus. Through most of the summer, then, even on the basis of administration in Oregon at the maximum duty allowed by decree, there would have been some surplus available for distribution throughout the summer of 1933 besides to Gardena, except for a period during approximately the middle of August.

If the rate of use in Oregon were one and one-quarter miner's inches to the acre there could have been irrigated in Washington acreages with rights subsequent to 1892 totalling 1179 acres, in Oregon 950, on July 22nd, and there would have been water for acreages besides Gardena throughout the summer of 1933.

If the rate of use of water in Oregon had been one miner's inch per acre, all rights on both sides of the line from 1893 to 1903 except the Hudson Bay Company could have been filled from the surplus and there would have been approximately 7 c. f. s. left over for the Hudson Bay Company on their 1903 right, and there would have been a considerable surplus all the rest of the summer if that had been the rate of use in Oregon.

The minimum on August 21st would have showed 816 acres in Washington with rights subsequent to '92 which were not in 1933 irrigated. 816 acres would by this method of administration have obtained water, and in Oregon 599 acres with rights subsequent to 1892 would have obtained water.

I have computed, also, the same thing for 1932 on the three rates of use in Oregon, based on the three rates

of use in Oregon, and also for 1931. Those are typical years.

The flow of the Walla Walla River at the forks in August, 1931, was the lowest shown in the fifteen years of the records which we have.

The flow in 1933 in August was slightly above the average, and in 1932 was somewhat below the average. We therefore have a succession of years which show a variation of conditions from the very dry year of 1931 through a moderately dry year of 1932 to a fairly good year of 1933, showing the variations in the conditions.

In the driest year of 1931, when rights in Washington had been closed off in June, that is, rights subsequent to 1892 had been closed off in June, on July 1st, 1931, according to the records shown in Hydrographic Data for water supply conditions, there would have been a surplus remaining for distribution after the Gardena shortage was filled of 13 c. f. s., and that would have supplied 338 acres in Washington and 288 acres in Oregon.

After the first part of July there would not have been sufficient surplus in 1931 from Oregon to supply any rights outside of Gardena, and not nearly all of the Gardena shortage could have been filled that year, even though all rights in Oregon subsequent to 1892 were closed.

If the rate of use in Oregon had been one and one-quarter miner's inches more rights would have been supplied on July 1st on both sides of the line, but after that period no rights other than Gardena would have obtained water—no rights subsequent to 1892 I am talking about here entirely.

If the rate of use in Oregon had been one miner's inch per acre there could have been irrigated from the surplus on July 1st 1277 acres in Washington and 1086 acres in Oregon with rights subsequent to 1892, and on July 15th, also, there would have been a small surplus for distribution, but after approximately the middle of July there would have been no surplus in addition to that requirement to fill the Gardena shortage.

These three tables, therefore, show the effect of the varying water supply on the spread of water which could be created by administration, and they show the greatly increasing spread of water which would result by the administration of water in Oregon on the basis of a duty and rate of use more nearly corresponding with the rate of use of water in Washington.

Some measurements were made to determine the gain in flow on the Walla Walla river from the state line to the mouth of Pine Creek (371).

Several cooperative studies were made in 1932, and the stream flow records of 1933 permit the computation of return flow in the upper four miles, that is, in the four miles from the state line to the head of the Gardena canal. The computation shows that the gain in flow of the Walla Walla river from the state line to the Kennedy bridge, which is just below the Gardena intake, averages about five cubic feet per second during the period of low water flow, in August. The measurements for both years agree very closely on that figure.

The average for July in 1933 is indicated to be approximately eight c. f. s. gain in flow from the state line to the Kennedy Bridge. Below the Kennedy Bridge mea-

surements were not made in 1933, but measurements in 1932 indicate at low water period a return flow from the Kennedy bridge, which I will note on the map, to the mouth off Pine creek,—show a total return flow in August, 1932, of approximately two cubic feet per second in that reach, which is approximately thirteen or fourteen miles long.

The river is in a position there to be a natural gaining channel; it is entirely in Washington lands throughout that stretch—the gain is probably from both sides of the stream, and it may be irrigation along the banks or from further back, or it may be just the natural pick-up of the stream.

It appears, therefore, the total gain in flow of the Walla Walla River from the state line to the mouth of Pine Creek during the low water period does not exceed approximately seven or eight cubic feet per second.

There are a few items which occurred to me since (this morning) which will bear a further statement.

The character of the stream, the Walla Walla River, above Milton, is typical of the gaining stream. That gain is shown by the existence of many springs in the canyons above Milton. The extent to which these springs are augmented by the irrigation above can not be exactly stated. The Table 4, already submitted, showed heavy over-diversions in the canyon above Milton. It does not appear possible that all of the water thus diverted can be used by crops or evaporated. Some doubtless returns to the stream through the ground, but the water which returns can not reach the lower river as quickly as if it had been left in the stream.

It is very hard to tell what the lag would be; immediately adjacent where the ditch runs along the river bank, there probably would be a lag of maybe an hour or two in some cases; near the mouth of the south fork the land slopes away from the river and the ditches lead over from the river, which is on the west side of the valley to lands which are on the east side of the valley, and water thus diverted away from the river might be delayed several days, possibly longer.

If the water were applied during the flood season and long delayed that application might become beneficial, if there were excess waters during the flood season. It might augment the stream at the period of low flow. I was speaking particularly of the waters which are diverted during July and August, in the low water, at which time, of course, every second-foot which can be made available is needed down stream.

I wanted to point out once more something which I mentioned in the beginning, that during 1933 there was at no time at which I saw the streams any flow from the Crocketts or from the Ford branch into the head of the East Prong or the West Prong. The connections across the north edge of section 26—north part of sections 26 and 27 were dry at all times when I was there in July and August, 1933.

The points I am speaking of now are on the outer fringe of the gravel delta north of Freewater where during the winter season—fall, winter and spring—there is surface flow from the upper reaches across the delta and into the East and West Prongs, but where during the irrigation season of '33 there was no flow. Those are the points at which I stated the capacity of the Crockett

channel to be approximately twenty-five c. f. s. and of the Ford branch in excess of twenty-seven c. f. s.—twenty-six or twenty-seven.

The measurements given in Hydrographic Data, Exhibit No. 18, show the daily discharge records of Wells Ditch, which diverts water from the East Prong, Spring Branch, as shown on the map in the southeast quarter of the southwest quarter of section 14, township 6 north, range 35 east. The data I am referring to here is in Table 4-A (Washington Exhibit 30).

I have computed the acreage with rights on the Wells Ditch as shown by decree, and in cases of doubt as to whether they obtained water from the Wells Ditch I inspected in the field as closely as can be done and believe that I have very close to the acreage adjudicated water from the Wells Ditch. I find the total number of acres with rights prior to 1909 of 167.18, with a maximum allowable diversion at the rate specified by decree of 6.27 c. f. s.

The measurements show that from the 13th to the 31st of July, 1933, the average rate of diversion into the Wells Ditch was 6.96 c. f. s. measured at the intake—or an over-diversion above the maximum allowed by decree of .69 c. f. s.

The August average diversion was shown to be 5.78 c. f. s., which is less than the maximum allowed by decree.

Measurements are also available on the West Prong of the Little Walla Walla Spring Branch (378).

The weirs for measurement of the water supply in the West Prong are in the south half of the northeast quarter of section 22, township 6 north, range 35 east.

The difference in flow at that point and of the West Little Walla Walla group of streams crossing the state line, which includes West Little Walla Walla River itself and two ditches conducting water therefrom into the state of Washington, is assumed to be used on the acreage intervening between those two points of measurement.

From the land descriptions in the decree on the West Little Walla Walla River I computed the total acreage which derives water supply from the West Little Walla Walla River between those two points of measurement and from that and difference in flow of the stream at those two points I computed the amount of over-diversion, if any, from that stream. Including in the acreage all rights prior to 1909 on the West Prong, the total acreage is 375.74, according to my computation, with a maximum allowable diversion of 7.85 c. f. s.

There was found on the basis of this acreage that neither in July nor in August was there a use of water on the West Prong in excess of this maximum allowable diversion. However, in view of the fact that rights in Washington on the West Prong and on other parts of the stream system subsequent to 1892 were closed during most of July and all of August, I computed, also, the acreage on the West Prong which has rights prior to 1893, and on that basis, also, I computed the over-diversion.

According to my computations, there are 117.29 acres on the West Prong with rights prior to 1893, and their maximum allowable diversion as stated by the decree is 2.81 c. f. s.

The difference in flow of the West Prong from the weirs in section 22 to the state line during July was an average of 6.91 c. f. s., indicating that on the basis of closure of rights subsequent to 1892 there was an actual over-diversion on the West Prong of 4.10 c. f. s. during July.

The difference in flow of the weirs at section 22 and at the state line in August was an average of 4.66 c. f. s., indicating an over-diversion during August of 1.85 c. f. s. average flow.

I should like to call attention to Table 2-A (Washington Exhibit 30) which gives a list of the springs in the Walla Walla area in Washington which contribute to the related stream system and on which the tables stated this morning for tributary spring flow are based. This table shows the measurements made August 13th to 16th, 1932, and on October 3, 1933. I neglected to call attention to that table this morning.

In connection with Table 6, showing the available surplus—showing the surplus which would be available if the rights on both sides of the state line were administered without regard to state line and distribution of that surplus, I neglected to call attention this morning to the fact that I assigned to the diversion for the city of Milton for domestic and municipal purposes a flow at the present time of two cubic feet per second.

I recognize fully the fact that the decree awards Milton the right of 7.24 c. f. s. for domestic and municipal purposes. However, with their present population of less than two thousand, and the fact that for domestic and municipal purposes does not include extensive use

for irrigation, and in view of the rather well-known figures on domestic water consumption of many cities, I assume that two second-feet is a liberal allowance for the city of Milton at the present time, which is the time at which I am basing my computation to show what available surplus could be obtained.

Two cubic feet per second for a population of less than two thousand is a supply of above eight hundred gallons per capita per day, which is far in excess of average supplies to municipalities in the United States.

Let me point out in the same connection that the Walla Walla city consumption as shown by the ratio of city use given in hydrographic data, Exhibit 18, relation of the Walla Walla city consumption to their population, is considerably less than the ratio I have allowed for Milton.

In connection also with Table 6, I wish to point out that I computed the Gardena shortage on the basis of the present administered area of Gardena of 5,631.33 acres.

The related stream system in Washington, as it has been called, consists of streams which are administered by the water master to supply rights of 1892 and prior by closing off all rights subsequent to 1892 except those rights on which there is a special court decree.

The related stream system thus administered consists of:

First, Mill Creek, including Blue Creek, College-Boyer Creek, Coyle Spring Branch, Lower Cold Creek, Titus Creek.

Second, Garrison Creek, including Bryant Creek and some small springs.

Yellowhawk, including Caldwell Creek, Lasater Spring Branch, Shelton Spring Branch, Stubblefield Spring Branch, Whitney Spring Branches, and certain small springs.

Mill Creek is 1, Garrison is 2, Yellowhawk, 3.

4 is East Little Walla Walla River, including Big Spring Branch.

5, West Little Walla Walla River, including Walsh Creek.

And 6, Walla Walla River, including Blue Mountain Spring Branch, McEvoy Spring Branch.

That is all the points I have. I will put them on the map at the recess.

There are pretty nearly three hundred wells in the Milton-Freewater vicinity indicated by small circles or dots on the map (Washington Exhibit 17). A survey was made jointly by the engineers of the two states in September, 1932, to locate and obtain measurements of flow and size of pumping equipment and size and depth of wells, and the records of the kilowatt hour consumption of power used in the wells indicates that during 1932 a total of nine thousand and ten acre-feet were pumped during the irrigation season in the Milton-Freewater area. I refer to hydrographic data, page 230 (Washington Exhibit 18).

NOTE—The testimony regarding wells was submitted subject to the objection of the State of Oregon (382).

We have had landowners testify here (for the State of Washington) concerning the injury to their lands

through shortage of water. I will take up the streams on which these several lands are located and (will state) what the supply of water for the aggregate rights on each of these streams was in accordance with their priorities if administered in the same manner as set out in my testimony this morning, based on the stream supply that I have found from examining the hydrographic data, starting with the East Little Walla Walla and Big Spring Branch.

My computation of the surplus which would have been available in 1933 on the basis I outlined this morning shows that 1893 rights on the East Little Walla Walla River total twelve acres, and that those rights would have been supplied with water if the rate of water in irrigation had been the maximum allowed by decree, those rights, twelve acres on the East Little Walla Walla River in 1893 would have had water on July 22nd, on August 1st, and a very small pro rata part on August 31st.

In 1932 that acreage would have been supplied with water for about ten or fifteen days after it was actually closed, according to the testimony of the Walla Walla County Water Master.

In 1931, that acreage would have had water for a short time after they were closed—after the rights in that year were closed, but after the first part of July they would not have had water the rest of the summer. That is on the basis of the use of water in Oregon at the maximum rate allowed by decree.

If the use of water in Oregon in 1933 had been on the basis of one and one-quarter miner's inches per

acre, 1893 rights such as these on the East Prong mentioned would have been supplied with water throughout the summer, instead of being closed off after about the middle of July.

In 1932, on the same basis of one and a quarter inches to the acre in Oregon, those rights would have had water through at least the first part of August.

In 1931, on that same basis those rights would have had water only through into the first part of July.

On the basis of one miner's inch per acre in Oregon those rights would have had water in 1933 through the entire summer.

On the basis of one miner's inch per acre in Oregon those rights would have had water throughout the summer of 1932.

On the basis of one miner's inch per acre in Oregon those rights would have had water through to about the middle of July, 1931.

The West Little Walla Walla River: 1893 rights on the West Little Walla Walla River total 43 acres. With an administration in Oregon at the maximum rate allowed by decree these lands would have obtained water through to about the 10th of August and after the last part of August in 1933 (385).

On the same basis in Oregon, in 1932 they would have obtained water to about the first of August.

On the same basis in Oregon they would have obtained water to shortly after the first of July, 1931.

On the basis of one and one-quarter miner's inches per acre in Oregon 1893 rights on the West Little Walla

Walla River would have obtained water throughout the summer of 1933.

They would have obtained water through to about the first of August, 1932, and to shortly after the first of July, 1931.

On the basis of one miner's inch per acre in Oregon those rights would have obtained water throughout the summer of 1933, throughout the summer of 1932, and to about the middle of July, 1931.

In computing the allotment of water for rights on the West Little Walla Walla in Oregon, I used the special decree (adjudicating those rights). I used the general decree for the rest of the stream system. Where I refer to the three rates in use in Oregon, I used the general decree and made no variation for West Little Walla Walla, because their rate of use is considerably less than that in the general decree.

On Garrison Creek there are 25.75 acres with 1900 rights. On the basis of the maximum rate allowed by decree in Oregon, in 1933, 1900 rights would have acquired no water.

In 1932, 1900 rights would have acquired no water.

In 1931, 1900 rights would have acquired no water.

On the basis of one and a quarter miner's inches per acre in Oregon about 80 per cent of the 1900 rights would have had water,—that is, there would have been water to pro rate on the basis of about 80 per cent of the 1900 rights participating up until the last part of July. After that they would be cut off.

In 1932, 1900 rights,—in 1932—about one-sixth of the acreage in Washington having rights would have par-

ticipated in the surplus down to about the 22nd of July; that is, on that date one-sixth of the rights would still have been participating in a small surplus. After that date they would have been without water.

In 1931, 1900 rights would have been deprived of water throughout the season.

On the basis of one miner's inch per acre in Oregon 1900 rights would have been supplied with their full allotment of water to about the 10th of August. They would then have been dry for a period and in the last part of August would have again been supplied to about two-thirds of their full amount.

In 1932, 1900 rights would have been supplied to their full amount to about the first or shortly after the first of August.

In 1931, 1900 rights would have been supplied to about the middle of July.

The 1895 rights on Yellowhawk total 208 acres. On the basis of maximum rate of use allowed by Oregon decree there would have been about three-fourths of a full supply for the 1895 rights in 1933 through to the last part of July, with no water available after that.

In 1932, at the same rate in Oregon, about one-fourth of the 1895 rights could have been filled until about the last week in July.

In 1931, 1895 rights would have been deprived of water throughout the summer.

In 1933, at one and one-quarter miner's inches per acre in Oregon, 1895 rights would have been supplied with water until about the 10th of August and for a short period about the middle of August would have been with-

out water, and again in the last of August would have received water up to about three-quarters of their full allotment.

For 1932, at one and a quarter miner's inches per acre in Oregon, 1895 rights would have received their full allotment until about the last of July, and about two-thirds of their full allotment for a few days after that, about the first of August.

In 1931, 1895 rights would have been supplied with water only until about the first week in July, after which they would have been deprived.

On the basis of one miner's inch per acre in Oregon, 1895 rights would have been supplied with their full allotment of water throughout the summer in 1933.

On the same basis in Oregon, 1895 rights would have received their full allotment until about the first week in August and would have received a little water toward the end of August.

In 1931 on the basis of 1 miner's inch in Oregon, 1895 rights would have received water only through the first—approximately the first week in July.

Lower Cold Creek is a tributary of Mill Creek and is, therefore, listed under Mill Creek in the compilation which I have made. I do not have a separate tabulation for lower Mill Creek and lower Cold Creek. The same statement would refer to all '95 rights in regard to water supplies to that vicinity (391).

In making my studies of the Walla Walla River, I have not made them entirely from an engineering standpoint. In such a study it is impossible to differentiate between engineering and agriculture and common sense.

As to my experience in agriculture, I worked on a farm once in 1913. I was in college at that time. I have never had charge of the distribution of water in any part of the country. I have never had any experience in the irrigation of lands. I, myself, have done no irrigating. I spent four days on this project accompanying Dr. Powers in soil reconnaisance which he made. I have made a good deal of study of soils in the last 3 or 4 years. The system of distribution that would distribute the water in the manner I have explained takes into account the available water supply and its disposal. In making my calculations, I have considered that that water supply would be the resulting surplus from such administration. The water supply was taken as measured at a point just above Milton. As to a consideration of any interferences with the distribution, physical formations in the country this side of Milton, I made the statement that in my opinion the gains which are not indicated in the surplus would approximately offset the losses which might occur in the stream system. As to whether I considered in my calculations that this water supply was available at all points, subject only to the deductions of diversions for irrigation, I have in mind that it was a continuous water supply which if not interfered with would flow on down to the state line. I would not say that in my calculations I have assumed that all interferences have been removed. What I did was to remove certain interferences which interrupt the supply at present and assumd if those interferences were removed the water would flow on down to the state line.

In my examination of the stream above the forks, I estimated that the canyon of the south fork runs from

50 to 100 yards wide, a little more than that at the mouth, possibly ⅜ of a mile wide. The sides appear to be basalt formation. All the water that comes within that canyon on the south fork must necessarily drain towards or into the river. That same condition exists on the north fork. From the forks of the stream down to the City of Milton, the canyon, being somewhat wider, is also bounded on its sides by basaltic formation, and necessarily the drainage in that part of the basin is to the stream. Below the City of Milton and to the east of the Tum-a-lum there are hills that extend from Milton clear past the state line. There is much less irrigated land on the east side compared to the irrigated land to the west of the Tum-a-lum. From the beginning, the large amount of irrigation has been to the west of the Tum-a-lum. The development of the country to the west necessarily required the diversion of water away from the stream. The physical formation of the country below Milton does not make the drainage in that part of the country away from the stream towards the west. For a distance of from a few hundred feet at Freewater, increasing maybe a half mile or possibly even a mile at a point opposite the McCoy Bridge, the drainage is towards the stream. In that territory from one hundred yards wide to half a mile or possibly a mile wide, the McCoy Spring Branch rises on the old McCoy place and flows maybe 100 yards until it enters the stream from the east side. Any spring rising on the west of the stream flows in a northerly and northwesterly direction, more northerly than westerly in the related territory. None of them enters the stream until the main stream turns in a westerly course. There are spring branches

north of McCoy Bridge which enter the main stream on its northerly course before it reaches the state line. The spring branches flow in general in that reach of the stream from the Nursery Bridge to the state line; what spring branches there are, both to the east and to the west, flow northerly parallel to the stream, and some spring branches flow in before it reaches the state line, and others don't join until after the stream has turned to the west.

The first spring that rises west of the stream just north of the McCoy Bridge is what we call the Hodgin Spring Branch, which flows parallel to the main stream for a distance of over three-quarters of a mile and enters the stream at the south edge of section 13-6-35, before the Walla Walla River reaches the state line. The other springs farther to the west as shown on that map and rising in the spring territory in sections 23 and 24, township 6 north, range 35, I should say flow in a northerly direction. Grandview Creek runs in a generally northwesterly direction. The trend of the Big Spring Branch is north bearing to the west.

In Table I (Washington Exhibit 30), I have taken the mean measurement for the month in the years 1918 to 1933. The station at which the records were taken is 212 located about a half mile below the north and south fork. I will mark it "212" on the map (Washington Exhibit 17). The station hasn't been there for several years. I will also mark Station B here as "216," Station B-1 as "215" and Station 214—the map isn't clear and I can't say within a quarter of a section where it is but it is above all irrigation on the south fork, so I

will mark it just above A-1. In taking that mean, I used the regional water supply papers from which those photostats (in Washington Exhibit 18) were made.

On page 44 of Exhibit 18 there is a table given for the year 1926. In Table I, Washington Exhibit 30, for July I took the mean as 80.6. On the 11th, 13th, 18th and 24th, the supply is below the average. That would essentially make no difference in the distribution, because that is an unusually steady stream in the low water period. It is rather unusual to have a stream so steady as the Walla Walla River is in any particular month in the low water period. There is a maximum variation in July of 1926 from 93 at the beginning of the month, it drops through the first week to about 82, from there on the maximum is 84, and the minimum is 72, and in my experience it is an unusually steady flow for that time of year (403).

My calculations of distribution (Tables VI, VIa and VIb) were not based on (the year) 1926. They were based on the actual flow on the 22nd of July and on the first of August and on the other dates in 1933, 1931 and 1932. They were not based on the mean flow at all. They were based on the actual flow on those dates.

In the future where the variation in years is as marked as this stream, my analysis certainly would apply, because I have used three typical years of varying water flow. 1931 was a year of minimum flow in August, 1932 was a year of slightly less than the average flow, 1933 was a year of slightly greater than average flow, so we have three examples of the years, each of which was different, and any other year succeeding would prob-

ably be similar, very similar, to one of those three years. If it is not similar it would be on the side, probably, of much greater rather than less.

I have no way of telling whether or not in the future the stream flow would be as it has in the past 3 years, except that the indication is that within the memory of man, the life of most men, the stream regimen does not change.

The only times that I have been upon that stream has been during the past 2 years. I noticed some pretty fast fluctuations in June following two heavy rains we had, about the 20th of June and the 28th of June. When it rains a lot in the hills, when the snow melts fast, the stream comes in rather rapidly. It is not torrential in nature in low water flow. When there is cause for fluctuation, it fluctuates quite fast and when the stream starts to diminish in flow, it diminishes very rapidly. Whether that diminution will occur within the period of a week, depends on how much diminution you mean, that is, it will—as soon as the rain stops in June, for instance, your heavy rains in the middle of June following melted snows in the mountains, the stream in 1933 raised to a flow of over six hundred cubic feet per second; then it started to drop, and by the 1st of July was down to—taking the two forks together, because I have not computed—at stations 214 and 216 the combined flow the 1st of June was 622.

On the 15th of June, 514.

Then it dropped to 300 on the 20th.

It dropped to 205 on the 1st day of July.

To 148 on the 10th day of July.

To 124 on the 20th day of July.

To 118 on the 31st day of July.

So there is a gradual drop, starting as soon as the June rains stop.

In June, 1933, the combined flow at stations 214 and 216 dropped from 646 c. f. s. on the 10th to 300 c. f. s. on the 20th, a drop of 346 second-feet in ten days, about 35 c. f. s. a day on the average. As to whether with those kind of drops and fluctuations in the stream the regulation of distribution from it is very difficult, nobody can use 600 c. f. s. of water up there anyway; so that has to flow on down through. After it drops, then the regulation can begin. After that it is not difficult.

I did not use the mean (flow) as a basis of distribution; I used it only to show fluctuation over the period of the sixteen years, fluctuation of average water supply over that period of time; for no other purpose did I use the mean flow of the Walla Walla River. I used those figures to show the flow that would normally be expected to occur in any particular month in the summer season. I did not apply the mean to my duty datum. I used the flow on the particular five days; I used the mean for the day; there are some slight fluctuations during the day—but the mean for the day is indicated by the recorder—the graph, and that is corrected and stated in the tables which are published. I did not calculate the mean for the month to determine whether or not the flow at that particular time was above or below normal. There are not serious enough fluctuations, according to my observation, during the days of the low water flow, to affect seriously, except as it is artificially fluctuated,—

for instance, by the Walla Walla city return, a fluctuation which is greater at night than in the daytime, would affect such irrigation. But natural fluctuation of the stream during the low water period aside from unusual rainfall would not affect the administration of that stream.

I am assuming here that there was not any such a fluctuation occurring upon that particular day. Whether the distribution of water on a particular day must be based on the minimum flow on that day depends on whether you have much fluctuation. If you have considerable fluctuation, you might have to base it on that minimum flow. In a territory the size of the Milton district, it takes some time for the water master to get over the whole district. With a steady stream flow it would never be necessary to employ enough men to regulate the ditches every day (410).

I made a study of the seepage losses along the stream in the Tum-a-lum section and on the Crocketts. We have data from which a theoretical analysis of seepage losses above Milton could be made, but it did not seem to me to be reliable enough to base any such computation on. Our observation is there are gains in the stream from the nature of the stream which I pointed out—the canyon slopes to the stream—that the stream above Milton is a gaining stream. I do not believe there is any appreciable seepage loss from the stream above Milton.

Below Milton along the Tum-a-lum, the stream bed is filled with boulders and gravel. At the Milton Nursery bridge, the Tum-a-lum is about 150 feet wide. It widens out below that. At the widest section below, between that

and the McCoy bridge, if you include the whole stream wash it is about a quarter of a mile wide, I would estimate; I never measured it. I should judge it is about a quarter of a mile wide, including the whole stream wash. The actual channels of the stream are not that wide, by any means.

At one point there, there are two or three channels where the water has evidently flowed at high water. There are evidences of one of the stream channels at that point I am thinking of—there are two or three channels, in all of which water flows at high water—but it is difficult to distinguish which could be called the main stream channel at that point. There is interchange. There is filling of one channel with boulders, and scouring out at other places, so there is constant change in that section, as on any stream in any section.

There are weeds growing through there, there are banks of soil, weeds growing in the channel. I tried to dig down into the rock, and found the rock was wedged in with a sandy, silty soil; I could hardly dig it out with my fingers.

The bed of that stream in the section between the Nursery Bridge and the McCoy Bridge, facilitates loss by seepage more than in the canyon above Milton.

I have a computation here which I made of the seepage loss in the Crockett branches. These measurements were made during the Fall of 1933 as shown in the hydrographic data. We measured the flow in the Crockett branches at the Frog, by means of the weirs. The weirs which measure the flow in the Crocketts are in the northeast quarter of the northeast quarter of section 2, town-

ship 5 north, range 35 east. We measured the flow at the Crocketts at the Frog both East and West Crockett branches. The diversions were measured,—or if they could not be measured—if there were no measuring appliances or no good section for a meter, they were estimated and reasonably closely estimated—the flow in the Crocketts at the edge of the gravel delta one-quarter of a mile north of the center of section 26, and at the center lines—east and west center line one-tenth of a mile west of the center of section 26—were measured, and from that data the loss in the Crocketts was computed.

We found that when we used a mean flow at two different periods—our tests were made during the fall—there was some fluctuation in the stream during that time—but we found that a week, a seven-day period was available in which the flow was fairly steady and gave a good indication of the mean flow. We found a five-day period succeeding that in which the flow was fairly steady and gave a good indication of the mean flow.

So that these are mean flows during those two periods of time.

We found that when 27.0 c. f. s. started down the Crocketts at the Frog, approximately 4.7 c. f. s. was lost before reaching the center of section 26. That is a loss of seventeen per cent. The total distance of channels is about six miles. The direct length from the Ford to the lower point is about two miles, but there are three different channels through most of the reach through which that water can flow for the later period.

When a flow of 44.3 c. f. s. started down the Crocketts at the Frog we found a loss of 6.8 c. f. s., or approximately fifteen per cent.

In my distribution of available water, account was taken of this seepage. We assumed the gain in flow which I pointed out is visible at certain places to a certain amount approximately offset the seepage loss. We have some data here, and we have measurements showing amounts of spring flow in the canyon. There is more than that. That does not represent the entire gain. It is not included in the water supply. There is more gain from other parts of the system which I pointed out.

There is no gain in the Crockett. In calculating my distribution it was necessary to assume that the water from the Ford and Crockett would be available in the main stream or water in the main stream would be available in the Ford and Crockett as the occasion would require. The Ford branch would be considered to supply water to the main stream through the (West) Little Walla Walla River. In the summer of 1933, the Ford Branch, at all times which I was past the place where it would supply water to the West Little Walla Walla, was dry.

In a system of distribution where the water could be switched from one place to the other, I made no calculations as to what would be the transportation loss of making such changes. Ordinarily that would be the position on the gravel delta where the major part of whatever transportation loss there is would be with the current (416).

I have measurements taken of the water that was flowing in the Tum-a-lum at the time it was turned down this fall. The gauge from which our stream records for two years at the Milton Nursery Bridge were obtained

was read on the 3rd day of November, when the water first, I believe, was observed to go through the main stream. I do not know how long in point of time it took the water, after it left the Nursey Bridge, to get down to the McCoy Bridge. I do not have that information. Our gauge at the McCoy Bridge was washed out at that time and was not available.

I think that possibly the state line record during the fall of 1933 might show what the flow was at the state line on the 3rd of November. I can tell you. At the Milton Nursery Bridge on the 2nd of November, 1933, the flow was 25 c. f. s.; on the 3rd it was 240 c. f. s. At the state line on the 2nd it was 8.8 c. f. s.; on the 3rd it was 160 c. f. s. In other words, the mass of the effect of the flow had already been felt at the state line within a day after the time it was felt at the Nursery Bridge. Not all of the flow had showed up yet, but the mass of it, the bulk of it, had showed up within a day. An increase at the Nursery Bridge of 215; an increase at the state line of 151. A loss of 64 c. f. s. Sixty-four second-feet on the basis of 240 would indicate a 25% loss but there is always some lag in the stream system, which would account for part of that loss. The rest of the water would come on later.

(425) We made the seepage loss measurements on the Crockett in the last part of November and in the first part of December, 1933. There was some diversion for irrigation on the Crockett at that time. The locations (of the diversion) are shown in the Hydrographic Data, and if not shown by location they were grouped together and estimated as miscellaneous diversions. That was included in the tabulation from which I com-

puted the losses in the Crockett. I believe you do not have the copy of that tabulation. That is just from notes of my own that I gave that data. Those diversions were measured whenever possible, but sometimes it was not possible; it was so small an amount, one-tenth or two-tenths of a second-foot, not possible to measure it, and it could be estimated with reasonable accuracy. Part of the diversions, which I have used in the computation, are included under miscellaneous estimated diversions in Washington Exhibit 19. Most of the diversion dams in the stream were not out at that time; in general conditions were rather similar to conditions as they had been the previous summer. There are not dams, there are dividing weirs and barricades at points across the stream—that is, planks or bulkheads for the purpose of dividing water between ditches, and some of them are weirs for the purpose of measuring. Allowance for the backing up of the water by boards in the dividing boxes which force water out into the ditches would be included in the measurements.

The quantities of water as shown measured in the main streams were measured at the head end and at the lower end. At the head end they were measured on the weirs which had been used all summer for measurement on the Crockett; on the low end there were no weirs and they were measured with current meter, with several measurements made and with discharge rating curves drawn, and the daily discharge records taken from the curves, as shown in the Hydrographic Data.

It was the measurements for two periods, one period of about seven days from the end of November to about the first week of December, and the second period of

about five days, about the 10th of December, both in the same year.

I think possibly evaporation loss, which is very slight, might be more in July and August than in November and December. The seepage loss would not be greater in case they put in boards to back up the water and throw more out upon the land, because there is no essential difference in such a condition between the way things were when these measurements were made and the way things are during the irrigation season.

It would not require the addition of more boards in the diversion points to throw out more water upon the land; it would require merely the removal of the farmers' diversion bulkheads. In fact I might state that the streams at that time of year (November and December) have more water in them than they have during the summer season. In most of the courses there is no water in the lower parts of the streams during the summer, therefore, the seepage losses measured at such a time as we measured them would be greater than during the summer.

The flow in the stream itself would be as free and unimpeded in December as it is in July. As the stream flow is lower in July, there are some slight adjustments which are made in the lengths of the control weirs across the stream during the irrigation season (429).

At every time I visited the Tum-a-lum during July and August, the entire distance between the Nursery Bridge and the McCoy Bridge has not been dry. At times there is water flowing from the Nursery Bridge for several hundred yards below the Nursery Bridge, and usually there has been water for some distance above the

McCoy Bridge. That would leave a distance of approximately a half mile that would be dry between those two bridges.

Mr. Humphrey and I were on the Tum-a-lum at one time in the summer of 1932 making measurements on return flow studies. We used the Nursery Bridge and the state line as measuring points. There was a space through there in which there was no flow of the river.

With this flow in 1933 of 19, 21 and 25 c. f. s. for 3 days, the state line had shown a slight rise, but it had affected the flow at the state highway, which is another mile or two below the state line. Not by reason of springs rising, but by reason of return flow in the channel of the stream itself, because as far as I know, from my observation, there are no springs in that reach—that is no visible side channel springs in that region between the state line and the state highway. The first large noticeable increase was on the 3rd of November, when 240 c. f. s. was put in—that came down with a flood to that amount of water.

I have tabulated discharge measurements at the state line, which I think is accurate enough for the purpose of this approximation here. The state line measurement I have (Washington Exhibit 47) on the 29th of October (1933) was 8; 30th, 8; 31st, 9; November 1st, 8; 2nd, 9 and the 3rd, 160 c. f. s.

In my Table III (Washington Exhibit 30), I used as the number of acres irrigated in Oregon with priorities up to and including 1909, as 3140.051 acres. That came from a lengthy tabulation of the rights listed in the Oregon decree by ditches, and by main stream systems, from the compilation of a card catalog system by which those

rights could be arranged in order of priorities, as they are not arranged in the decree, by the addition of the acreages with rights for each year cumulatively to that date, and by subtracting from the total acreage thus given the acreages with rights on Couse Creek and the Hudson Bay Company right. As to whether I consulted Stipulation No. 3 with regard to areas under irrigation under each priority, I am not sure what Stipulation No. 3 is. I consulted what I understood was the stipulated tabulation of the Oregon and Washington rights for a check on my work. Assuming that the stipulation shows 4363.34 acres in place of 3140.51 acres, it would materially change my estimated use of water. Such a large change as that would of course change the result.

In calculating the distribution of water, the theory which I have advanced is based entirely upon one water supply—that from Oregon coming down. The water supply on lower Mill Creek (for instance) would be relieved under this system of distribution, if surplus was available for lands on the Walla Walla River below the mouth of Mill Creek from other sources than Mill Creek, rights on lower Mill Creek would not have to be closed off to supply those lower priorities. I took no cognizance (in my calculations) of the renting of water (436).

All of my figures with regard to springs for the Washington area are based entirely upon the measurements of August 13 and 16, 1932, and October 3, 1933. The only way in which the flow of the springs in Washington came in (my calculations) was to determine whether acreages irrigated from those spring branches would be benefited by additional water from Oregon. If there was enough water in those spring branches ap-

parently from those two measurements of those spring branches so that the water would run to the lower river if rights in those spring branches were closed off, then those rights on those spring branches would be benefited by additional water from Oregon. If, however, there was not sufficient water in those spring branches as indicated by those two measurements to supply all the prior rights of those spring branches, then subsequent rights on those spring branches would not be benefited, and I so considered it.

I considered those springs as sources of supply for Washington. I used that calculation for the three years, but the flow of the springs enters only in a minor way.

To relieve the situation, we will say, on lower Mill Creek, I would transport the water through natural channels—part of it down the Tum-a-lum. I considered how much water would have to be turned loose at the Nursery Bridge in order to reach the lower rights upon the Walla Walla, in the amount that would show up eventually. Twenty-two second feet would go through eventually. As to how much water would have to be turned in at the Nursery Bridge in July of any year, I couldn't say, because in July there was none turned in there and we couldn't measure it. In June, 1932, when I and Mr. Humphrey were making a study there 20 c. f. s. did not get through (but) there was flow at the state line continually. The water that was turned down at the Nursery Bridge did not get over the dry spot as a surface flow; it might have gone under it. The stream from the McCoy Bridge down is a gaining stream; that is true whether water is going over the spillway at the Nursery Bridge or not (440).

You can get a pretty good indication of the loss there would be from the amount that was turned down there in June, 1932, from the figures. There is difficulty in making figures of that which are accurate, first, that there is no time of the year that I have observed when there was a steady flow at the Nursery Bridge down the Tum-a-lum for a long enough time to get accurate measurements; the flow is either dropping rapidly or it is rising rapidly, and that is not a condition which is conducive to good hydraulic measurements to see definitely what happens.

In June, July and August the stream between the Nursery Bridge and the McCoy Bridge is not naturally a falling stream, it has already fallen. There is no water there. To attempt to get 22 c. f. s. down the Tum-a-lum during June, July and August would to some extent be wasteful and to the extent of the waste would not be economical. It would not be as economical as a really good irrigation canal.

The channel of the Ford Branch below the northeast quarter of the southeast quarter of section 22-6-35 and in section 15 has all the appearances of being a natural channel. The channel of the Crockett north of (the place) where the branches come together in the northeast quarter of section 26-6-35 has the appearance of being a natural channel. In the upper channels of these streams, on the delta, there's considerable evidence of artificial change. Up in there is where I made my study of seepage. The measurements in Table IV (Washington Exhibit 30) were made at the weirs where they branch out of the Frog. In estimating the amount of water to be distributed, I measured the over-diversion

at these weirs and not down at the point where the farmer diverts from the stream. The seepage between the weir at the measuring point and the farmer's diversion point would decrease the amount of over-diversion.

In making a distribution of water on priorities irrespective of the state line, part of the surplus would necessarily have to come down the Crockett. That is due to rights on the Little Walla Walla River in Oregon between its intake and the Frog, which requires at least, as I remember, about 55 or 56 c. f. s. to pass the Peacock Mill, which has a non-consumptive use right. That water can go only to the Frog from the Peacock Mill; there is no channel by which it can return to the Walla Walla River or Tum-a-lum; it must, therefore, go to the Frog, and be distributed from the Frog. If the rights of the lands to which water is distributed from the Frog were administered in that manner, there would be some water remaining in the Crocketts to come down to Washington through the East and West Prongs. The Ford Branch would also supply the West Prong (447).

The indications, as far as I can gather from the data I have, is that most of that water entering the upper end of the Tum-a-lum at the Nursery Bridge would show up in the stream channel by the time the state highway bridge in Washington is reached. There may be some loss in that reach which enters the underground reservoir, but it does not show gravity outlets in the Big Spring Branch, in the spring branches along the Tum-a-lum, and possibly further to the west, in the East Prong.

The McCoy Bridge to the Nursery Bridge is about 2 miles. The Frog is about a quarter of a mile directly

west of the Nursery Bridge. .The distance from the Frog to the McCoy Bridge would be (the length of) the hypotenuse of a triangle which has a quarter of a mile base and a two mile altitude.

There is always a difference in a dry section when the stream is a rising stream from that when the stream is a receding stream. When the stream is a dropping stream, points down the stream always show a greater flow ordinarily than points up stream; while if a stream is a rising stream, downstream points will ordinarily show a less flow than points upstream. That is what makes measurements under such conditions very difficult of analysis (449).

My theory of distribution (while) irrespective of state lines was not also irrespective of natural conditions—not any more than the existing stream system up there is irrespective of natural conditions. In the development of the ideal, it is sometimes necessary to make a great many adjustments and variations because of natural conditions and sometimes it is not, depending on the simplicity of the computations or their complexity. I did not assume a perfectly ideal condition. I assumed conditions as approximating about what they are at present. I took the Oregon present practice as one basis of distribution and assumed the practices which are different from what they are at present using for comparison. My theory of distribution would not compel an entire change of the present Oregon method of distribution. It would involve some change and improvement. Of course, with rights subsequent to 1892, particularly considerably subsequent to 1892, it would involve a rad-

ical change; on rights prior to 1893 it would not involve a radical change, although it might involve some change. I do not think it would compel a complete lining of the conduit through which the water would be conducted to get it down to the lower Walla Walla without loss—without *any* loss, yes, but without reasonable loss, no. I have not computed it without loss. I have assumed, as stated before, that the gains in stream flow which were not considered here, offset the losses throughout the system. For that assumption, we have measurements which we have brought out that we have measured the springs in canyons which total 4 or 5 c. f. s. at least, and other sources of gains which are not shown in the surplus. There are those sources of loss which have been stated to be in the Crocketts, the figures being given yesterday, which are not excessive losses in the neighborhood of 4 to 6 c. f. s.; then in the Tum-a-lum a certain unknown amount which may be slightly greater, but according to all indications is not an excessive loss.

Whether I, as an engineer, would recommend the construction of such a project, based upon the amount of information I have, was not a requirement. If I were starting out with no irrigation in this valley, I would redesign the system entirely at the start, because it has just grown. I would have started measurements made and continued them for as long as it was possible to continue them. Whether I, as an engineer, would recommend the investment of large sums of money based only upon the information upon which I have based my theory here, such facts as I have shown, I believe would warrant certain changes (453).

At this place Washington Exhibit 30 containing Tables I, II, IIa, III, IV, IVa, V, VI, VIa, VIb and VII were introduced in evidence as part of the testimony of James G. Woodburn.

The witness resumed (1179-1190):

(1180) In order to make clear the record in regard to the losses and gains which I used in the computation of my Table VI (Washington Exhibit 30), I will state that I used actually a net excess of losses over gains of approximately 7 c. f. s., which is contrary, possibly, to the impression I left (in my testimony) in which I said that the losses approximately were offset by the gains.

I have the schedule which I was given at the Pacific Power and Light Company office as the schedule under which the rates during the years 1932 and 1933 were computed. This (schedule) is published Tariff 59, Public Service Commission of Oregon No. 17, effective February 28, 1933. This schedule also, I should state, in regard to date, was the same as was in effect in the summer of 1932.

The net rate charged consumers for power is at the rate of 6 cents per kilowatt hour for the first 50 kilowatt hours used per month per horse power of maximum demand.

The next fifty kilowatt hours used per month per horse power of maximum demand are charged for at the rate of one and one-half cents per kilowatt hour.

Excess monthly consumption over the above is charged for at the rate of ¾ cents per kilowatt hour.

There is a minimum monthly charge of a dollar and a half per month per horse power maximum demand.

There are quantity discounts which apply only after the monthly bill reaches a hundred dollars. Most of the irrigating plants which I investigated have bills considerably under $100, and, therefore, are not affected by the quantity discounts.

This plan of charge for electric power, it seems to me, to have some effect on the amount of electricity used for pumping. The reason for its having an effect is that there is a certain minimum charge under which very little or no water might be pumped, and after the usual minimum water requirements are met for the lands excess amounts of water can be pumped at the low power rate of ¾ cents per kilowatt hour, so that it is often cheaper to use excessive amounts of water rather than to pay for labor to manipulate lesser amounts more efficiently.

I have computed a hypothetical case in which I have computed the power consumption and the monthly bill for a ten-acre place irrigated by a 3 horse power motor operating a pump of an over-all efficiency of 60 per cent under a 40-foot head. This is a typical plant and corresponds closely to a large number of plants for pumping irrigation water in the Milton-Freewater area.

I find by that computation that to pump a depth of six inches of water in a month over the ten acres would require 342 kilowatt hours, a 3 horse power motor would have to operate the pump 21 per cent of the time, and the power bill would be $11.57.

If 12 inches depth were obtained over the ten acres, the power consumption would be doubled, that is, 684 kilowatt hours, the pump would have to run 41 per cent

of the time, and the bill would be $14.13, an increase of only $2.56.

If 18 inches depth of water were obtained over the entire 10-acre tract, the power consumption would be 1026 kilowatt hours, the pump would have to run 62 per cent of the time, and the bill would be $16.70, again an increase of $2.57.

If 24 inches depth of water were obtained over the 10-acre tract in one month, the power consumption would be 1368 kilowatt hours, the pump would have to run 82 per cent of the time, the bill would be $19.26, again an increase of $2.56.

If this farmer wished to use water more efficiently by installing a 5 horse power motor and the larger pump so as to irrigate for shorter periods with larger flows, other conditions being the same, he would be penalized in power costs, as shown below.

To obtain six inches of water over the 10-acre tract, the power consumption would be 342 kilowatt hours, the pump would have to run 12 per cent of the time, and the monthly bill would be $16.38.

For 12 inches depth of water, the power consumption would be 684 kilowatt hours, the pump would have to run 25 per cent of the time, and the bill would be $20.13, an increase of $3.75.

To obtain 18 inches depth of water, the power consumption would be 1026 kilowatt hours, the pump would have to run 37 per cent of the time, the bill would be $22.70, an increase of $2.57.

To obtain 24 inches depth of water, the power consumption would be 1368 kilowatt hours, the pump would

have to run 49 per cent of the time, the bill would be $25.26, again an increase of $2.56.

Thus it is seen that a six-inch depth of water provided by a 5 horse power pumping plant costs nearly as much as 18 inches depth with a 3 horse power plant. The result is that places of 10 acres or less are operated usually with 3 horse power or 2 horse power pumping plants, and in many cases they run these plants continuously throughout the summer (1185).

As to my opinion as to what is the loss of water in the Tum-a-lum section from the Nursery Bridge to the Washington state line, I will state that under the conditions of steady flow, which occur very seldom throughout the year in that stretch, the measurements which we have, as given in Hydrographic Data, Exhibit No. 18, indicate that during the period from the 18th of November, 1933 to the 5th of December, 1933, inclusive, was a period of fairly steady flow at the Milton Nursery Bridge, at the state line, and at the State Highway Bridge, about two miles below the state line. The average flow during that time at the Nursery Bridge was approximately 20 cubic feet per second. The average flow during that time at the state line was approximately 15 cubic feet per second. The average flow at the state highway during that time was approximately 18½ cubic feet per second.

In that stretch of the river there is one tributary named Hardesty Creek which may get its water from the east side of the valley, far enough away from the Tum-a-lum section so that it cannot be called a part of the Tum-a-lum channel. That, in my opinion, is the only tributary in that reach which is not essentially a part of the stream

channel itself. Hardesty Creek during that period was fairly steady at about two cubic feet per second.

That gives a very strong indication, therefore, and is the most reliable data that we have and indicates that the losses in the Tum-a-lum from the Nursery Bridge to the state line do not exceed seven cubic feet per second at that flow, while from the Nursery Bridge to the state line the losses do not exceed 3½ cubic feet per second.

The distance from the Nursery Bridge to the state line is about four miles, and from the Nursery Bridge to the State Highway Bridge is between five and six miles.

Those tabulations (Washington Exhibit 47) which I have prepared are taken from the Hydrographic Data except for the averages and summaries, which are my conclusions from the Hydrographic Data.

In my measurements here, the time that the stream bed is dry between the Nursery Bridge and the McCoy Bridge is shown by no measurements being taken. The measurements under the columns headed "Opposite Dugger Place" and "Below McCoy Bridge" were not started until November 27th, 1933. The fact that there are no figures merely means that the measurements were not taken. I believe that prior to November 3rd, 1933, there was a dry stretch there below the Nursery Bridge down to within a short distance of the McCoy Bridge. I was not there at that time to inspect it. On the other sheet (Washington Exhibit 47) the amounts shown beginning with the 25th of June, would indicate that the stream bed was turned approximately dry below the Nursery Bridge. There was, as shown here, a trickle there. I made no tests of the loss from the Nursery Bridge down to within a mile of the McCoy Bridge only

as shown here. The Dugger place, I might explain, is about a mile below the Nursery Bridge—opposite Dugger place, about a mile north of the Nursery Bridge. That is in the fall of 1933, measurements were made at that point. That there are no measurements opposite the Dugger place up to the 27th of November wouldn't indicate that there was no water flowing in there up until that time although earlier in the fall I am sure there was no water flowing at that place. By earlier in the fall I did not mean that the channel was dry at all times. It was not. There was a period in there starting with the 3rd of November, in which there was water, considerable amounts of water, flowing, but in general previous to the first of November the channel at that point was dry.

At this place Washington Exhibit 47, being the compilations of Dr. Woodburn, was admitted in evidence for the purpose of illustrating his testimony and showing his computations (1189).

CARL A. LARSON, for the State of Washington, testified in part (896-912, 1174-1177):

I reside at Prosser, Washington. I am with the U. S. Department of Agriculture, Bureau of Plant Industry, Division of Western Irrigation and Agriculture, holding the position as agent cooperating with the Irrigation Branch Employment Station at Prosser, Washington. I have been carrying on this work at Prosser since 1931. I have the degrees of B. S. in General Agriculture, and of M. S. in the Department of Soils, from the State College of Washington. I also have a Doctor's degree from the same institution.

The work at Prosser consists of irrigation experiments on various crops, on irrigation plots, on orchards

and alfalfa, corn, wheat and potatoes. The other work consists of work with salt soils, salt concentration of irrigation waters, and general farm work, distributing water, at the 200 acre station. Prosser is in the Yakima Valley, 30 miles northwest of Kennewick and about 87 miles northwest of here (Walla Walla). The Yakima River is a tributary entering the Columbia River near Pasco.

I have made a study of the water requirements for lands in the Walla Walla River basin. I accompanied Mr. (F. O.) Youngs on a few occasions at the time he made his soil survey. He finished the soil survey for the lands in Oregon in 1932. A similar survey was made of the lands on the Washington side. That was completed last year (1933). I am acquainted with the basis of the soil classifications which Mr. Youngs used in preparing this map, Washington Exhibit 15. Mr. Youngs classified the various soils into groups that had similar characteristics in regard to irrigability. The slope of the land was considered, the texture of the water table, and the salinity. To determine these characteristics, Mr. Youngs used methods that are commonly practiced by government soil surveyors, as using a speedometer that was graduated in hundredths of a mile for distances, and using a plane table with a compass for his directions, and using a ruler on his map which was an inch to the mile graduated in fiftieths of a mile, and following the roads and crossing through sections on forties, where there were no roads, while with the aid of the compass distance was paced off until coming to another road where he could also check his distance by section lines. The method of investigation, of course, included the questioning of farmers on whose farms he would happen to cross, looking into wells,

see the profiles, ditch banks and road cuts and any other excavation that was available to show the profile of the soil.

I couldn't say whether he examined the county records and other data that might aid him in arriving at his conclusions. I found the map (Washington Exhibit 15) very helpful in determining water requirements. The soils were grouped in similar types that had similar characteristics and these groupings were shown on the map in different colors. The soil characteristics which determine what particular class the type of soil takes are the steepness of the slope, the water table and the texture of the soil.

The color key on the map (may be) explained. The areas colored in green are the No. 1 soil, not very steep, smooth to unrelated, of good texture, a deep soil, and of good water-holding capacity. The 1-R are the rich soils, which are of a good texture, well drained, and some of them are irrigated considerably, especially in the western part of the area. 1-R-A, which goes with that, is 1-R soil and upland soil on the bench, but the A was added to that to show that the land was not nearly as steep and laid very well for irrigation. 1-R-A is designated upon the map by a little lighter green than the No. 1 (soil). Another large section that is very prominent is No. 3, which is designated by this rather orange color.

The sections up here on Mill Creek, southwest of the City of Walla Walla, there are a few patches of this No. 3, but the big sections are above Mill Creek and down here in this large delta above Freewater (902).

2-A is of a small quantity and very scattered. The largest acreage in any one place is shown on here next to the hill on this side, and a few small spots on the forks in the river above Milton, and also against this hill to the west of Freewater. The 2-A soil is shallower than the number 1. The gravel will be found from a foot and a half to four feet,—that does not mean that the gravel is free from soil. 2-A is designated by the yellow color.

2-B is a much shallower soil and approaches more nearly to the 3 type. The covering of the soil is from six inches to a foot and a half, and underneath that the soil is somewhat similar to this 3 type.

The difference between 3 and 2-B is the fact that there is a fairly clean soil covering, usually. That is designated by the—it is almost as yellow as the 2-A here.

2-B is also in small patches and is usually found around the edges of this gravel bar, this fan. You see the small patches of 2-B on the edge, and also mingled in (the region along) the river southeast of Milton. The 2-B generally borders the 3 soil. The distinction between the 2-B and the 3 is that the 2-B has a fairly clean soil covering. 1-D is the land that is salt, the water table is usually within 6 feet, but the salt concentration on 1-D is not sufficient generally to harm that growth; that is designated on the map by the purple; there is a considerable amount of that all along the river, salt land.

4 is similar to 1-D in regard to water table. It differs in that the salt concentration is usually strong enough to be injurious to plant life, and also calcified or lime hardpan located in some of those areas.

And 5 is—very little of the No. 5, which is similar to 4 in salt concentration, but it is on higher ground and does not at the present time have a water table. No. 5 is mostly down in this section around Lowden and Touchet, and is designated (on the map) in a dark brown color.

No. 6 is the non-agricultural land, the river-wash, and steep slopes that can not be cultivated. There is much of it along here and along here and along the Walla Walla River, where the river wash is predominant.

The investigational methods employed to determine my conclusion as to the water requirements of these various soils, included a survey of these various types, looking at the soils, supplementing the texture observations with soil samples after an irrigation to get a good estimate of the amount of water the soils held after they were irrigated, compensating for the time for those soils to drain, and determination of the weight of a cubic foot of soil on the representative types, in order to have a basis for making an estimate of the acreage that would be held in the different foot levels of the soil.

I went to a number of farms with a set of questions which, as I asked the questions, I looked over the farms, as the questions were answered, to get information in regard to irrigation practice and the cultural methods used. This was late in the fall, and I depended a good deal on the farmers' statements for the crops that they produced. In a few cases, such as alfalfa,—the hay was there, and could be judged—the production of it—but the apples had all been moved off—most of the fruit had been moved off. I took into account the soil conditions and the typical types. In determining the field capacity, of course, the texture of the soil has a great deal to do with that,

supplemented by moisture determinations made on representative pieces, and the weight of the soil.

A very good, close estimate was made of how many acre-inches were required to fill that soil to the third foot. Soil samples taken after an irrigation or a sufficient rain to supply as much water as would be put on by an irrigation to fill that soil gives a very close estimate of the field capacity, if the soil has had an opportunity to drain—sufficient time after the irrigation to drain (906).

I determined the basis for the time element from the number of samples taken at the Irrigation Branch Experiment Station at Prosser. I got a very good idea of how long it would take the soil to drain out the moisture. Soil samples were taken in the first and second foot of depth and the soil survey of the various groups designated quite closely the depth of the soils. The samples consisted of 200 four hundred grams. There was not particularly any difference in the size of samples for different types of soil. Those samples were taken to get a profile of the depth at which I wished to take it. I did not necessarily use a larger quantity of soil in determining the requirements for the gravel type. The profile depended on how heavy a section of the profile that I took. I don't think there was any difference—remarkable difference between those. Most of the water deliveries were made on the constant flow basis except that a group of farmers were rotating. There is no storage water for irrigation involved in this territory that I know of. In determining the water requirements, I took into account the type of water delivery the farmers were using. The majority of the irrigation in this territory is corrugation—furrow irrigation. The length of furrows varies a

great deal; sometimes this is determined by the lay of the land; other times the furrows are just too long for efficient irrigation in some of the soil types—the length of furrows—some of the longest down on the 1-R group soils near Lowden, close to a quarter of a mile, from that on they dwindle down to very few feet, according to the lay of the land. The width between the furrows was, in the gravelly soils, some instances the furrows were only put by the tree rows, leaving fifteen to eighteen feet, approximately, between the furrows. For farm land, such as the alfalfa, the furrows were put three and a half or four feet.

With a small amount of water, irrigating an orchard, for instance, the furrows would have to be rather close to the plant roots, so the roots would only be wet. If more of the soil was wet up, the corrugations would have to be put closer together. For closely grown crops, such as the row crops, the corrugations would have to be put closer, the more the soil would be wetter. The length of time the water was allowed to run in the rills I found varied a good deal according to cultural practice. Some of the long rows, the water was allowed to run as much as sixty hours. And then on the gravelly soils the length of run was considerably shorter—four to six or twelve hours.

The length of the furrows, as I said, ranged according to the lay of the land, a distance range of from a quarter of a mile down to a few feet.

The distribution systems examined showed that there were very little irrigation works, usually just irrigation out of earthen ditches, with no structural turn-outs on to

the corrugations, but just filling the ditch up and not overflow, into the furrows (909).

And in the Gardena section there was more flume encountered than any other place on the project, and irrigation works consisted of spiles used in the banks, a large number of spiles used to divert the water out of the supply ditch into the corrugations. I did not find water-saving appliances in general over the valley. The water penetration varied a great deal according to the cultural practice, the growth, and somewhat in crops. The crops were divided into orchard, truck crops, and alfalfa, quite generally; some sections the orchards probably being about fifty per cent of the crops grown. That is quite true in the gravel bar above Freewater, that the orchards were approximately fifty per cent of the acreage, I believe. I did not find many farms of one crop production. Most of them were diversified.

For the purpose of determining water requirements, I think a large number of these soil classifications shown on the map (Washington Exhibit 15) should be grouped. I would suggest a group of 1, 1-R, 1-D, 1-RA, 4, 5 and 2-A. In the second group I would put 2-B and 3. The water requirements for the first group, which I will term Group A for the purpose of my testimony, I set at 4.8 acre feet and on a constant flow basis of about a half miner's-inch per acre. I am speaking of gross duty—the diversion at the stream. The water requirement I should allot to Group B, that includes types 3 and 2-B, is one miner's-inch to the acre. That is gross duty. That amounts to 9.68 acre feet on a basis of 6½ months season. The distribution of 9.68 acre feet for Group B is ratable by the month. It gives a gross of 18 acre-inches per

month. That requirement was set as it was to take care of the peak month. The other months, the earlier months and perhaps the later months, would not be nearly as much, but on a constant flow basis, in order to get the water for the peak month, the high amount was set. I considered that to be sufficient for any peak month. If they take the water in April, May and part of June, it would be an over-delivery. That soil in the sand district which is labelled Class 3 will store very little water from one part of the season over to the other. In arriving at that amount I did not consider any of the use records for any particular pieces of land. With limitations, the use which has been made of water is the important factor in determining the duty. Whether the duty of water should be fixed at an amount somewhere near what the farmers use in actual practice, depends on what you term reasonable efficiency in applying water. In setting the duty of water I don't see how you can disregard either the maximum production per unit of water or the maximum production per unit of land. Where a farm is being operated by a large amount of water, which gives him a maximum production of crop per acre but the average production per acre foot of water used is low, I would want to know how he was irrigating before I would reduce his water. Assuming that he was irrigating in a reasonably careful manner, without any excessive waste, cultivating his corrugation so that the water will be sure to go in, and (yet) he didn't have enough water, then it would be reasonable to give him more water. If he was not using efficient methods, he should not have more water. As to whether it has heretofore been the custom in a great many instances, in projects throughout the nation, to try to

spread out the water over too much land, my experience does not cover (the) great number of projects you speak of. From my reading of material on this question, a number of projects were started without any soil survey and it was found that the soil was so shallow in a good many cases that it could not profitably be farmed. The cutting out of those particular parts would not necessarily increase the amount of water that would be available for the other parts of the project. I have in mind the Sunnyside Project, which I am quite familiar with.

In considering the duty of water, I studied the depth of the gravel soil on the No. 3 lands in and about Freewater and Milton. In no place did I encounter hard-pan. In regard to the texture of soil, the heavy soil seemed to carry down pretty well through the first foot; after that it became quite coarse. In no case of wells have I found virtually a clean gravel formation below. I did not find a cement gravel strata. My investigation did not take me down to the cement gravel. In some of the wells that I examined, I found them curbed down for a distance of 8 to 20 feet. I took no tests of the soil below the first three feet. I made no study of the soil below the first three feet. The texture of the soil below the first three feet where it becomes coarse has a great deal to do with the vertical drainage. The vertical drainage is a very material determining factor in fixing the head of water necessary to get over a tract of land and irrigate it, after considering the surface. After considering the surface, the same is true, in fixing the number of irrigations that is required during the growing season. The profiles that were shown, the texture carrying down the coarse sand and gravel mixed with the rocks, gives a good estimate

of the loss of water from vertical drainage without having studied the soil formation below the third foot. By profiles I am referring to some of the wells that were opened and from the discussion of this type of soil with the soil surveyor. I did not see any of these profiles in the wells that were curbed. If my recollection is right, there was a well that was open below the curbing on the gravel fan, No. 3 land, up on Mill Creek and there was a well above Freewater, too, that was open below the curbing. The other information on that was also derived from talking with men who had dug wells. I derived my knowledge of the soil conditions below the three feet from the conditions set forth. There are so many of the wells curbed up, I assumed that curbing was necessary from the top of the ground to the place below the loose gravel formation, or they wouldn't go to that expense. In fixing the duty of water, the expense which the irrigator has gone to, is a matter for consideration. Providing the irrigator has used every efficient method that he could and then didn't have sufficient (gravity) water, if he has gone to the expense of putting in a pumping plant, it would be powerful evidence that his gravity supply was too small. The expense that the irrigator goes to, to augment his water supply during years of low prices, makes it a matter of greater consideration (919).

I have not carried on any irrigation work upon lands of the same character as the No. 3 soil. My work has been distributing water upon the experiment station farm, near Prosser. From my experience there (at Prosser), I would consider that the economical length of (irrigation) furrow in the distribution of water upon No. 3 lands here, should not be more than 200 feet. In my ex-

amination of the lands on the gravelly soil, I measured several of the furrows (there) with the speedometer; they were right around 600 feet. That would be approximately a 36-rod run. They were located in the northwest quarter of the southwest quarter of section 26, township 6 north, (range) 35; that would be right at the north end of the gravel belt, as indicated on the map. In the classification of soil there (on the map) the northwest quarter starts with No. 3 and drops to 2-B and then to 1. That run was all on No. 3 land. I do not know whose land that was on. There were a large number (of furrows) on the gravel belt, No. 3 land, 20 rods in length. If in the development and progress of irrigation in the community, the irrigation practice had brought into use furrows 20 rods in length, or substantially that, and had found such use economical I would say that the furrows should be longer than 200 feet (but) with limited water, in order to use that efficiently, without putting additional irrigation works in, the rows should be shortened.

In considering the duty of water, I took a number of those yields per acre from questioning the farmer. We have statements that the farmer considered his yield reduced by reason of the shortage of water such as that in No. 3 land on Mill Creek. I do not recall that any one I interviewed on the No. 3 land near Milton and Freewater made that statement. If the cutting of the supply of water, on a farm well cultivated and in a high state of production, using 20-rod furrows, injured the crop, that would not necessarily be proof that the duty of water was too high. If he had shortened the rows after that experience and cultivated his furrows so they would not break over, and perhaps took some precautions with ir-

rigation works in his ditch, I would say then there would be an opportunity to lower the duty. I wouldn't say that the theories on irrigation practice and the use of water, must necessarily yield to actual practice. As far as irrigation efficiency goes, you should, it seems to me, expect a reasonable amount of efficiency in comparison to another district. In other districts I have not had any experience with the particular classes of soils I have around Milton and Freewater. In my experience I don't believe I know of any soil which is just like it. Generally it seems to be unusually fertile and productive for that class of soil (923).

In making my soil tests I did not test for the moisture equivalent to the soil. I did not make any test to determine the wilting point. As to the correction in my moisture test for gravel and stones in the soil, I took a profile of the gravel soils; naturally (I would) have to discard some of the larger rocks, but I think it was a fair example of the profile. In order to get rid of those large rocks you necessarily had to break your formation—you couldn't have it in the natural formation in your test. The profile would naturally crumble when you took it, anyway. Those rocks in the soil run down to as fine as sand, up as large as niggerheads. As to the size of a niggerhead; its a niggerhead—6 or 7 inches in diameter would about strike it. From that down to a couple of millimeters in diameter for what we call gravel. In my classification of soils, I do not make any distinguishing classification between the soils that contain different sizes of stone, to test for moisture. I was mainly interested in what the foot level would hold, and tried to get a representative profile for that.

I found the longest (irrigation) furrows near Lowden. The soil was classed as 1-R. It is possible to get the water to the end (of the furrow) with running it a long time. It was common in those long furrows (quarter of a mile) to run the water 60 hours. I wouldn't say that the crop production on the irrigated lands near Lowden is very low generally. A lot of the bottom land near Lowden is No. 4 which is saline, at least. Parts of this land are used as pasture; in order to keep the salt from concentrating on the surface and killing what little pasture grass there is, this salt concentration must be diluted. It cannot be done by drainage except through washing, and where the drainage is not provided, you can only wash it to the water table. I think that it would be considered as an economical and beneficial use of water to take water from the Class 3 land up by Milton and Freewater and turn it down for this salt grass land by Lowden, just as (the Lowden lands) are now, without any drainage, provided they can grow pasture on it to pasture livestock, if the use of water is excessive in any one place and it can be used beneficially on another. Seems to me, the balance between the two economically, how much the pasture is worth, if any can be grown, and the value of the other; considering also that if the above farmers on the gravel used efficient methods of irrigation and still were short of water, why, it should not be taken from the high producing areas to put on the lesser area. That is my opinion. A large number of the pasture lands in that area were (irrigated) by flooding. I did not determine the concentration of black alkali down there (927).

To determine the efficiency of the irrigation practice

up on No. 3 lands by Milton and Freewater, I selected and visited twelve places that I considered quite representative of the area. I did not visit the Warren Reeder, Alta Rogers, or Elba Rogers places. I was not informed as to the places test runs had been made on by the State of Oregon. Talking with the farmers and seeing some of the rows running is the only thing I would have to judge by as to the head of water required to get over No. 3 land. My conclusion as to that is not based upon any actual present knowledge of my own except by comparison. In making my test I estimated that to fill the majority of the root zone, say the first 3 feet, upon the No. 3 area, it would require about 4 acre-inches. In determining that factor, I considered the soil beneath the 3-foot depth, very low in holding capacity. The porosity, the coarseness should increase the vertical drainage. As to the percentage of loss by vertical drainage, in the first place, I did not calculate to have enough (water) on to lose a great deal—just what would hold. The 4 acre-inch application would just give about what the soil for the first 3 feet would hold without any vertical drainage, provided all the available moisture was exhausted in that 3 foot depth. In actual farming, very few of the farmers would be that exact. That is compensated a good deal because all the available moisture is not exhausted. They put on a little bit less at one time and a little bit more at another time. I wouldn't say it was impossible in actually applying the water to the field to approach the exact measurement of 4 acre-inches. On my experimental plots at Prosser, a third of an acre, I am able to use field methods of irrigating and apply that amount of water. That is fine, sandy loam. It would be considered as

Class 1. I believe that the farmer could reach a higher stage of efficiency, some of them, on the gravel than they are (reaching) now, with not a great deal of expense. Under the conditions delineated, I do not think it would be impossible. In my test, I did not take samples in the interval between irrigations. I did not make tests to determine how long No. 3 soil will hold usable water after an irrigation, only judging from the irrigation interval. Under my experiments, the water content of the No. 3 soil would have to be restored (in) about eight to ten days. If a crop has a tendency to temporary wilting, it should be irrigated. If a tree begins to wilt, it is not necessarily a sign that you have waited too long before applying irrigation; it may mean that the last irrigation was not efficient. If the water did not penetrate when you irrigated, it was also not sufficient. In the irrigation of some crops, it is necessary to maintain the moisture content of the soil at a reasonable point above wilting point in order to get the best production. In no case have I found that the (fruit) trees were damaged unless the water in the major portion of the root zone got down to the wilting point. Temporary wilting may affect the quality of the fruit. I didn't take moisture samples to determine what percentage of the water applied at the edge of the plot can be accounted for by samples of the moisture stored. There is very little difference, in most cases, because the rather large head of water that is put on pushes the water through the furrow and then is cut down to cut out the waste water, so that there is about an hour's difference at the head over that which is at the bottom. The trees of these orchards near the headgate may have been more vigorous and larger than

(those) down at the lower end of the furrow. I didn't take particular notice of that, however. Assuming that as a fact, it would not necessarily indicate a greater water supply for the (more vigorous) trees. I have in mind an orchard over on Mill Creek where the trees look just as good at the foot of the orchard as they do at the head. There is no water table there. This is on No. 3 type and very seldom is there a water table there that I noticed. If the water table stands higher and closer to the surface in some of the No. 3 soils, I haven't noticed it, and I haven't heard about it. I found no such case on the No. 3 lands (near) Milton-Freewater. I did not find any places on the graveled section, No. 3 soil, where the natural gravel would indicate that the water was closer to the top.

(1174) I have a soil survey bulletin that was of a survey that was made in the Mill Creek area of the Walla Walla Valley, in 1902, by Mr. Garnet Holmes, a soil surveyor.

In this soil survey he did not have nearly as many groups of soils as they are grouped now, because of the practice at that time. But the groups that he did pick out--that he did mark on the soil survey map at that time were accompanied by a text showing the mechanical analysis of the soil.

In his description of the soil he called this No. 3 soil, which is quite definitely marked on the maps on the Washington side, in the relatively same position as they are now,—his descriptions were the gravel ran from very small size, from one-third of an inch up to cobblestones, the depth of the soil carrying down pretty well for two feet, which is the description that fits the sample No. 3.

And the location of the sample as located on this map (Washington Exhibit 15) was in the northwest corner of No. 1140 of section 19, township 7 north, range 36. That point is in the center of this No. 3 area, a little bit to the south of the center of that strip when you consider the line north and south.

Now, the mechanical analysis of this sample as made by government soil surveyor, as far as the screenings, mechanical analyses go, it is fairly comparable to the same method used today in mechanical analysis. The gravel—it is called gravel—the size of two millimeters to one millimeter. This, of course, is not the whole soil, but the fine earth of that soil. There was 3.12 per cent of gravel of that size. Remember, considering the fine part with the big rocks taken out—the coarse sand, one millimeter to .5 of a millimeter, 6.26 per cent.

Medium sand, .5 to .25 of a millimeter, 3.92 per cent.

Fine sand, .25 to .1 of a millimeter, 11.5 per cent.

Very fine sand, .1 of a millimeter to .05 of a millimeter, 21.7 per cent.

Silt, .05 to .005 of a millimeter,—44.34 per cent.

Clay, .005 to .0001 of a millimeter,—7.88 per cent.

This soil survey is entitled The Mechanical Analysis of Yakima Gravelly Loam, Fine Earth, and under the third column it describes it as Gravelly Loam, Zero to Twelve Inches. That means the depth of the first foot. There is not any indication whether or not or how much, any larger stones were taken out.

As to the stage of development and thickness of population on the No. 3 soil area on Mill Creek, shown in orange on Washington Exhibit 15, the No. 3 soil area on

the upper parts of Mill Creek is quite extensively farmed and also the No. 3 section in the lower part here in section 22-7-36 is particularly extensively cultivated. And just to the north of that in section 15 and part of 16—there is considerable land that is idle in that section—and in the part southwest of Walla Walla there is one area of the No. 3 on Stone Creek that is very extensively cultivated—farms there even in the gravel will grow vegetables, and just to the west, the tips of this No. 3 and 2-B area here, southwest and exactly west of the City of Walla Walla, section 19 and the section below 19, are quite extensively cultivated.

At this place Washington Exhibit 46, being the Mechanical Analysis of No. 3 Mill Creek Soil, identified in the record as "the soil survey of 1902" was introduced in evidence.

WILLIAM W. JOHNSTON, for the State of Washington, testified in part (938-998):

I am Reclamation Economist with the United States Bureau of Reclamation, Department of the Interior. My duties under that Department consist essentially of the agricultural phases of the work that the Bureau has to do, including the classification of lands, the investigations of duty of water, and certain economic problems connected with the repayment of water charged, the ability of lands to repay charges. I have been with the Department in my present position a little over 8 years. I have a B. S. degree in Agriculture in the Drainage and Irrigation Departments, from the Oregon State Agricultural College. I was field agent for the U. S. Department of Agriculture engaged in duty of water experiments for about 4 months in 1917. I was a member of the faculty in

the Soils Department of the Oregon State Agricultural College from April, 1919, to October, 1925, engaged largely in soil and irrigation investigation work. In the year 1924-5 I was on leave of absence as a Research Fellow at the University of Missouri, at which time I received a Master of Arts degree.

My investigation locally has been for the purpose of familiarizing myself with soil and agricultural conditions, with a view of determining the water requirements largely on the basis of comparison with use in projects where I had made investigations. I have made an examination of the types of soil here. I have attempted to acquaint myself with the irrigation practice in this locality. I have spot-checked this soil map (Washington Exhibit 15) in the field in certain places to check on its accuracy. I found the map sufficient for my purposes. I am acquainted with Mr. Youngs' methods of classifying soils. I just met Mr. Youngs at one time. However, I have had occasion to use his maps on several other projects, and I have found them in those cases to be very accurate soil survey maps. From the investigation I have made here, it is my opinion that the soil classification shown on the map (Washington Exhibit 15) should be grouped to arrive at the practical division of soils for water requirements determination. I recommend the same grouping which has been described—that is, the real gravelly, shallow soils which are Class 3; of the next group, which is slightly deeper, but more or less associated, 2-B, those two being grouped together; that the remaining types be grouped in the second class. They subject themselves to that grouping as to their water requirements. The variations which occur cover only small

acreages. For the purpose of my testimony we will refer to the gravel group as Group B and the balance as Group A.

For Group A I would recommend one-half miner's inch per acre,—that is, as a diversion duty at the point of measurement, which would give practically the peak month a diversion of .74—if I might refer to my notes here—gives for the peak month the diversion duty of .74 of an acre-foot. I would estimate losses in this class as fifteen per cent, which would make at the land a duty for the peak month of .63 of an acre-foot.

If the water rights are to continue on the basis of continuous flow, this would make the requirements for the six and a half month season approximately 4.81 acre-feet per acre.

My conclusions for group B would be a diversion of .9 of a miner's inch per acre, which would give 1.34 acre-feet as a diversion duty in the peak month, and one acre-foot of which is estimated would be delivered to the land. That is figuring a transportation loss of twenty-five per cent (942).

With a continuous flow that diversion would be approximately eight and a half feet at the land, based on six and a half months season. I took into consideration in arriving at my conclusion as to water requirement the local conditions as compared to other projects where I had had time to make careful determinations.

The principal basis of this determination is the study I made in the Sunnyside valley in 1930 and 1931. The work, as I say, here, has been to adapt that study to these local conditions.

I have made studies in other projects over the country. The duty of water has been one consideration in practically all the studies that I have made. I could not list all of those for you. The ones, though, where the duty of water was measured, would be one that I have just completed on the Verde district in Arizona, the Gooding project, the extension of the Minidoka project, the Casper project; those are projects where the duty of water has been a matter of major consideration.

I am familiar with practically all the projects under the Reclamation Service, possibly 3 or 4 I have not been on. The investigation of the Sunnyside division was a determination of duty on what are known as the supplemental contract lands; that does not include all of the Sunnyside division; these are lands that were formerly in the Washington Irrigation Company, taken over by the government in 1905. The total area I covered was approximately thirty-six thousand, six hundred seventy-three acres.

I selected the Sunnyside division as having application here because the conditions were more nearly similar in climate, in method of delivering the water; that is, they used small irrigation heads, and a large part of the soils was comparable, and the remaining soil, the Class 3, falls between the two types, in my opinion, of that determination, so it gives, I believe, a good method of comparison (944).

The plan followed in the Sunnyside division of the Yakima project was, in the first place, to make careful classification of the land on the basis of water requirement. In doing this I went over all the land myself, I had

a helper, and put down test holes, put down an average of one for every ten-acre tract.

Each of the various ownerships was examined, notes were made as to the length of run, and furrows, the apparent care with which the landowner handled his water, the crop appearance, whether there was indication of excessive use or lack of water, and the acreage in different crops.

Then from the records at the Sunnyside office the actual water use delivered to each of these tracts was compiled for a period of eight years. The only reason the eight years was used, we started out to get a ten-year period, but didn't have time to get the other two years. But we considered eight years would be representative.

I then had the actual water measured to the land, to consider in connection with this field study. On this basis I divided the area into five classes. We then summarized the actual water delivered to a farm for each of those classes for the eight-year period which formed the basis for the duties that I recommended; that is, these amounts were modified to the extent that my field study showed there was a gross over-use of water or that they had not used enough water or that excess water had been used early in the season as a matter of project administration; that is, the water there is delivered on constant flow basis; I believe seven hundred miles of canals and laterals. Since it is continuous flow, it is necessary to get that all spread out, and in order to have the system working when the water is really required they encourage the farmers early in the season to in some cases use water so that they can get the needed amount spread out into the ditches and into the laterals.

The government took over these lands at Sunnyside in 1905. These were lands which had a water right, an established water right and had been used prior to 1905. These were lands of the Washington Irrigation Company. When the government came in they purchased the canals of the Washington Irrigation Company and contracted to deliver water according to their contracts with individuals. I do not have the information at hand as to exactly when these lands were first put under irrigation, but they are the oldest, practically, of such lands in the Yakima Valley irrigating.

The first matter in making a comparison of what I find here in the Walla Walla Valley, with the Yakima project, is a matter of climate, to see whether the climatic conditions were enough similar to warrant using that data. I have here the 1933 climatological summaries for the states of Oregon and Washington from which I have made copies of the amounts on two tables here. One shows the annual precipitation for the year 1933 by months, together with the departure from normal, from the stations at Walla Walla, Milton and Sunnyside. I have calculated from the amounts in 1933 and the departures the normal rainfall.

I might say that these reports do not give that calculation. They simply give the amount in 1933 and the departure from normal, so I have calculated that on these sheets.

We find that the normal rainfall in Walla Walla is 17.01 inches per season. In Milton it is 14.41. In Sunnyside it is 6.48 (947).

In comparing the amount per month it will be noted that July is not as dissimilar as are the other months, but

even then the rainfall in Sunnyside is appreciably less than at Walla Walla and Milton.

In June, for instance, the rainfall at Walla Walla is 1.12, at Milton it is 1.01, and at Sunnyside it is .38.

So that I believe in every month the rainfall here has been greater than at Sunnyside.

Now, I have concluded from that that from the standpoint of natural precipitation this area had some advantage over Sunnyside.

The other sheet which has been handed out is likewise taken from those climatological data from those two stations, and shows, first, the approximate elevation.

It will be noted that Walla Walla is 991 feet above sea level, Sunnyside 740, Milton 1100.

The annual mean temperature is 54.5 at Walla Walla, 51.5 at Sunnyside, 53.4 at Milton, showing that the annual mean temperatures here are slightly higher than at Sunnyside, but it is interesting that the maximum, the high, is 104 in each case.

There is likewise, on the right-hand side of this table, given the number of rainy days, Walla Walla 114, Sunnyside 69, Milton 82.

The number of clear days is highest at Sunnyside, being 212 as compared to 115 at Walla Walla and 128 at Milton.

Number of partly cloudy days is likewise considerably greater at Walla Walla and Milton than at Sunnyside. The same is true of the number of cloudy days.

Now, from these data I have concluded that any higher water requirement in the Walla Walla country here that might be brought about by the higher mean

temperatures would certainly be balanced by the greater precipitation and the larger number of rainy or dark days.

I do not claim from that that these small amounts of rainfall in the summer will have much of an appreciable effect as far as that individual amount of rain is concerned, but the lower transpiration and the lower evaporation during rainy periods does have a marked influence on the irrigation requirement, so that if there is any difference I would say the climate would indicate a lower water requirement here than at Sunnyside. However, in my determinations I assumed that that factor was the same in each case.

In the classification at Sunnyside I used five classes of soils.

The duty Class No. 1 was made up of water-logged lands. They were generally naturally fairly smooth, since they were water logged, and usually of medium texture, but they were lands where the water table was so high that they were not given regular irrigations.

The next class was made up of smooth lying, medium textured lands, where the water table was high enough to have an appreciable effect on the irrigation requirement. These areas were regularly irrigated and had to be irrigated to produce crops, but the water table did have some effect.

Then the third class includes the well drained, medium textured soils which really make up the bulk of the good land in the Yakima country, the area in the vicinity of Zillah and the general well drained, medium textured soils in that vicinity.

Now, the latter type compares very well from the standpoint of the irrigation requirement, in my opinion, with these various phases of the type 1 that we have here.

The 1-D would include lands that are similar to those that I have put in the Classes 1 and 2 at Yakima. That is, I adopted the areas which were sub to the extent that they needed practically no irrigation from those which were still subject to needed irrigation.

Then the 4 and 5 which are here, are a class that would compare with lands that I put in at Class 3 at Yakima.

Now, when we get to the gravelly types here, they are more nearly comparable in water requirement, in my opinion, to the two other types at Sunnyside. The type 4 at Sunnyside was made up of soils which were less than 3 feet either to gravel or to basalt (950).

Now, the area to the east of Grandview for a number of miles and clear south to the river is underlaid by gravel at various depths; there is quite a variation there in the depths to gravel. Then these basaltic soils occurred more down in the vicinity of Prosser. However, it is not the same type as Mr. Larson described as on the Experiment Station. It is down in the valley proper, below the type up at the Experiment Station.

Then the last class, Class 5, was made up of the extremely porous, sandy soils, which were scattered over the project, the larger acreage being in the land south of Snipe's Mountain.

Now, the use records on these various types for the eight-year period as averaged were, for the type 1, 1.59

acre-feet per acre, with the peak months of July using an average of .39.

The type 2, which, as I say, is partly subbed, used an average of 2.88 acre-feet per acre, with .57 acre-feet per acre in the peak month of July.

The Class 3 used an average of 3.98 acre-feet, with .74 in the peak month.

The type 4, which was—that was less than three feet either to gravel or to loose basaltic rock—used 4.66 acre-feet per acre, with .85 in the peak month.

Now, the Class 5, these extremely sandy soils, used an average of 6.74 acre-feet per acre, and 1.21 during July.

Now, these use records can be explained a little further here to make their application here be clearer. These are averaged by ditch riders' beats. The reason we did that was that these beats include lands more or less under the same part of the lateral system, and also because they divide the area according to the different locations of the project.

Now, there are two beats here in which all the uses in all these different classes were much greater than any of the rest. *One is Beat 8, which* used for the—I had no Class 1 in that, but Class 2 used 4.02 for the season as compared to an average of 2.88.

The Class 3 used 5.04 for the season, as compared to an average of all the beats of 3.98.

Class 5 used 8 acre-feet per acre as compared to an average of 6.74.

Understand that, to the best of my ability, the classification in each of these beats included the same type of

land, the same type of irrigation required. The topography and drainage entered into that, as well as the type of soil.

Now, the second beat which had irrigation uses considerably in excess of the average was in Beat 12. Naturally I had to go into that quite thoroughly to decide why these uses were so much greater in these beats, and I found that these happened to be lands which used the tail water from direct-connected pumps, these direct-connected hydraulic pumps which serve lands in the Outlook and Snipe's Mountain and one other pumping district there. While these were designed to utilize just the water for pumping that would have to go down to those lower laterals, in actual practice they push more water through in order to pump the water needed on these upper lands, with the result that under lateral 8, for instance, there was a large head of water going by all during the irrigation season which would be wasted back to the river if it wasn't used, consequently in the administration of the project they let these water users use practically all they wanted to of that water (952).

Now, these rights that I have been referring to here, these old supplemental rights, had contracts with the government which gave them the use of water after paying a certain amount for the supplemental storage—the maximum, I believe, was sixteen dollars an acre—but after that they only had to pay one dollar per acre for operation and maintenance, and the contract read that they should have three acre-feet or as much more as in the judgment of the authorized government agent was required to produce a crop. The result was that no matter how much water they used they were only charged a

dollar an acre. That was in contrast with the so-called public notice lands, where they paid in most years two dollars for the first three acre-feet, unless they were in a classification that gave them more water than that, and any additional they had to pay a dollar and a half an acre-foot; so that the use of water in these two beats, as near as I could find out, was practically all that the farmer wanted, and in addition it cost him no more to use a large amount than it did a small amount, so that that accounted for those heavy uses in those two beats, and the average without them would have been considerably under the figures that I read to you.

Now, the recommendations I have made, I believe, for this A Class, compare very favorably with these uses, when we consider the excesses that I found there, and in the case of the B lands that we have here the comparison as far as soil goes is not so exact.

The 2-B portion of our soils here, which we have thrown in that B type along with the 3, would compare very closely with the gravelly phase of the Class 4 type in Yakima.

Now, the 3, the Class 3 here—excuse me, the type 3, is a different soil than any large body up there, although there are small areas within this 4 type which would correspond in water-holding capacity and in the porosity of the soil. The sandy lands in that vicinity differ from these in water—I should say, in the irrigation practice required, in that the large amounts there are necessary because of heavy percolation losses in irrigation rather than on account of the small water-holding capacity. On the other hand, in my opinion, these Class 3 lands here, the high water requirement is not due to

the fact that you cannot spread your water readily in irrigation, but it is due to the fact that the water-holding capacity is low and you have to irrigate more frequently than you would otherwise.

The top soil on this No. 3 land in the Walla Walla territory is a coarse, stony and gravelly soil. In the examinations that I made, I found that to a depth of about sixteen inches the soil in between the stone and gravel is of fairly heavy character. It is difficult to make a real finger analysis, because the small pieces of rock in there made it feel rather gritty, but it must contain a considerable amount of colloidal material. I would say that if you could screen the rocks out, the soil that is left would be at least as heavy as a silt loam.

In view of the type of soil between the rocks in the No. 3 soil, this type of soil would require less water than the Class 5 soil, which was the real sandy soil, in the Yakima Valley, but probably a little more water than the Class 4, which included the fairly good soil underlaid with gravel.

Since I have only been here a short time, I had to arrive at my conclusions regarding irrigation practice in the area with No. 3 type of soil in Oregon, largely from examining the farm irrigation systems. I would say that the irrigation practices are far behind the general agricultural practices. In fact, that is very striking, and on small farms, very intensively cultivated farms, you find the conditions of irrigation furrows, conditions of head ditches, the method used in making furrows, of a type that you would expect in an area which was—in a cheap area, where the farming was very extensive.

As to water-saving appliances in evidence in that territory, I think I saw one flume about a hundred yards long up near Milton. You could see it from the road along there. That is the only thing that I saw of that type. I didn't see any turning-out devices from the laterals to the land, for saving water.

There was very little irrigation going on in the territory. I can remember of about three places where I saw water being used. With respect to corrugations in the Milton-Freewater territory, I found that in general in the area I was able to see in this short time, the irrigation runs appeared to be quite long. Now, in stating that I would define what I mean by the irrigation run. I mean the length of the furrow from the real head ditch, delivering ditch, until there is another head ditch. That would not mean the length or the distance from the head ditch to a point where a pick-up furrow is crossed (956).

As to the practice of putting in pick-up ditches at intervening points between the place where the water is turned on the land and the lower end of the land, it is, of course, desirable to pick up any necessary waste that may be had from furrows of the proper length, but the more efficient practice would be to have a second head ditch, so that when you are irrigating your second run, except for what little you get from those furrows, you can have a run down there in a single ditch. If you irrigate ten furrows, for instance, out of the upper run and pick up water that runs out to the end and irrigate five furrows below, you are using, really, ten delivery ditches to get at your second five furrows.

I wouldn't consider the practice of having 18 to 20-rod rills down to the pick-up ditch and a second line of

rills of approximately the same length from the pick-up ditch to the lower end of the tract, on the No. 3 soil in the Milton-Freewater territory as good irrigation practice. The effect is almost the same as if we had a run of 660 feet instead of 320. Short runs is to prevent the over-percolation of water in the upper area of irrigation and the purpose of the second head ditch is to thereby shorten the run to prevent the early over-application of water.

The length of run in the vast majority of cases in the Yakima Valley is 320 feet. In some of the sandier soils, it is shorter than that. On some of the heavier soils, particularly the areas with hardpan and somewhat alkaline areas, the runs are twice that distance, or six hundred sixty feet.

While I do not have all my notes here to be sure, I don't remember of any run over six hundred sixty feet, unless it would be where there was a triangular-shaped piece and there might be a few furrows at one end that would run longer than that. The vast majority were three hundred twenty feet.

In row crops the practice with respect to cleaning out ditches is almost a hundred per cent to cultivate as soon as possible following the irrigation and until such time as that crop gets up to where it will shade the ground and to where cultivation would break down the plants, but otherwise to cultivate after each irrigation. In orchards with a cover crop it is practically always—that is practically always done there in cases that come under my observation, that they clean them out between irrigations,—clean the furrows out, that is. Of course, they do not recultivate the whole area.

There is no peculiar physical condition in connection with Class 3 soil in the Milton-Freewater territory which would make the distribution of water on the land particularly difficult, as far as the individual irrigation is concerned. The soil apparently subs quite readily. I have found, from the few farmers I have been able to interview on it, it is possible to get the water through a run of twenty rods in about two hours without washing. That indicates the deep percolation as far as that individual irrigation goes is not so bad but what they can spread the water very rapidly in the surface soil.

The colloidal nature of the soil is an advantage but it may present some problem, in that if an irrigation furrow is not cultivated following irrigation, be more of a tendency for it to bake; if the second irrigation came on without that being cultivated it would be quite possible considerable water would run through without percolating into the soil.

In my opinion it would not be necessary for the shallow soil included in Group B to lose a great deal of water through deep percolation, if the proper irrigation system were followed.

I would say that my allowance for Group B was comparatively liberal, when you consider the nature of the agriculture here. The principal thing, of course, which has led me to reach a conclusion as to the liberal allowance, is the peak requirement. It is necessary during that period, in my opinion, from about June 15th to August 15th, to have a fairly large supply of water, so when the duty is applied on a basis of continuous flow it makes the total extremely high. However, I believe the

amounts I have recommended are liberal for that period —are sufficient for that period.

The estimated transportation loss is liberal when it is considered that the distance from the points of measuring are extremely short. I believe considerable improvement could be made to reduce transportation losses, without any great expense. It would be expensive to line the (ditches) and stop all losses, but I find in these ditches the banks are undercut, frequently the fall is so excessive in places that there is a tendency for the ditch to cut to one side or the other. There are many cases where the weeds are grown up along the edge, which cuts down the flow. The simple proposition of going in there with a shovel and cleaning up the ditches would make a measurable difference in the amount of water delivered (961).

As to whether on irrigation projects places of excessive loss are improved with flume or pipes or concrete lining, something of that sort, depends on the intensity of the agriculture. If it is in an area where they have large farms, and per acre crop returns are low, they ordinarily do not go to so much expense to fix up their ditches. In areas where the water is valuable and the agriculture is intensive, it is customary wherever there is an excessive loss to line it, put in a flume. Of course, there are cases where it can be improved by holding down the grade, allow it to silt in. There are many things that can be done to save water, which are not expensive, that (might) be applied in this territory, I would say, from what I have been able to see since I have been here.

I believe that the use of a greater amount of water than I have determined as the water requirement here, in general would be more apt to be harmful than beneficial,

when you consider all factors. It might not, as far as one area is concerned, but particularly on the shallow soil like we have here, the loss in fertility from excessive irrigation is really an important factor.

To illustrate that, that is not entirely a theoretical proposition,—I found several years ago, upon talking to several of the best fruit-growers on the Okanogan project in Washington, upon the Okanogan River, near where it joins the Columbia River—that those farmers, who were extra good fruit men, found—gave the opinion, at least, that they were able to get much better use out of sodium nitrate fertilization than they did at Wenatchee. They attributed that to the fact they used so much less irrigation water than at Wenatchee.

I can not substantiate that one way or the other. But I give it as an opinion that is prevalent among the better farmers.

In my opinion, the amount I have recommended is all that could possibly be beneficially used, considering the condition in that territory, with the methods of farming, methods of irrigation and character of irrigation which is consistent with the other farming operations. In fact I believe that Stipulation No. 7 on file in this case is for a lower duty but I did not feel justified in recommending that much water.

(963) I went to school under Dr. Powers at the Oregon State College, at the present time am released from the government work, and am here at the instance of the State of Washington.

I have had the opportunity to observe considerable irrigation on stony, gravelly soil. I have not actually,

myself, handled the water on it. I have not conducted duty of water experiments on the kind of soil we have there around Milton.

There are small areas of the Sunnyside Division down near the river that are stony and gravelly. They were not, however, sufficiently large to make a separate classification for them. The classification as to soil in Sunnyside, that I refer to, was made entirely by myself except that Dr. Powers was brought in for a few days to review my work and to advise with me. There was a prior classification made there for what are known as the Public Notice lands, which are a part of the Sunnyside division, but this was not the area I covered. The prior classification (of Public Notice lands) was made by representatives of the local irrigation district. I understand it was based on a study made by Professor Harding, but the actual classification was made by the district. I presume Professor Harding is familiar with the class of land in the Sunnyside district. Dr. Powers, in his review of my studies, also became familiar with it. However, at that time, he was only there a few days, but he had a chance to see the different types. I do not believe that he was there much longer than I have been here upon this particular matter. I do not recall exactly the time.

I started my investigation here last Friday, March 30th. (NOTE—The witness testified Wednesday, April 4th.)

In the study of water requirements of any particular soil, the problems of distribution affect the amount available at the farm. You have to consider the rise and fall of the stream, if at the low point it gives you a water

shortage. The minimum amount is not necessarily the only basis you can really consider in the distribution of water; depends on how long those low peaks would last. You could adopt a mean in such cases unless the low periods were of several days' duration. Whether the irrigator that came in on the low point of the water supply would suffer, will depend on the length of time those shortages occur. I would say if the distinct difference between the water available lasted over a period of a week, it would have that effect. Whether if the sudden rise last one day, the irrigator on that day would get an over-delivery, depends on your method of handling water. If there are simple division weirs off of the various streams that are wide so a quick fluctuation in the elevation of the water would push a great deal into that small canal, it will make more difference than if that is not the case.

The amount for Class 5 of 6.74 acre-feet on Sunnyside are the actual measured measurements, but it is the mean for a period of years. As far as I was able to find out, the years where they used less than that, did not represent a shortage of water in use. The difference there was more apt to be due to a difference in cropping, because they are the lands in the Sunnyside which have had the most water. In computing that amount for each year, it would be the delivery divided by the acreage in each class. In the duty up there I considered the mean per acre-foot supplied per acre; I likewise gave considerable consideration to the fluctuation and the amounts that I have mentioned here are not the duty I recommended; those are the actual measurements released.

I did not mean to give the impression that the fluc-

tuation in the amount of water used by different farmers was caused by the change in crops. If I said that, I misunderstood your question. I meant that the mean use in one year compared to the mean use in another was affected more by crops and climatic conditions than it was by the available water supply. The crops which a farmer raises have some effect on the amount of water he uses. A lesser supply of water would not necessarily change the character of crops that some of the farmers would raise. Any reasonable duty recommended would not change the character of the crops. It might change the acreage in certain crops in any one year. I have never heard of a duty of water being determined on the basis of the peak requirement of any one crop. If this man raised his entire acreage in some crop with an exceedingly high peak requirement it would require a change to a reasonable rotation of crops (970).

As to whether in order to permit the versatility of crops in a district like the Milton district, it is necessary that the decree should be fixed at the lowest duty of water that any crop which they raise would require, I can't say as to the court decisions, as that is entirely out of line with the experience I have had in water requirement, with the Bureau of Reclamation or elsewhere. The duty of water should permit the growing of a reasonable portion of a man's acreage in that type of crop. The supply of water itself will not necessarily affect that proportion. It isn't good farming practice, regardless of your water supply, to put your entire acreage in any one crop, from an economic standpoint or the agricultural standpoint. I wouldn't say that the prosperity of the irrigation project is almost entirely reflected by the

quantity of water that it has available. I would say that the prosperity of an irrigation project is limited if they do not have a sufficient supply, but is certainly not in direct proportion to the supply of water they have. The land values and the diversity and the intensity of the farming do not decrease as you decrease the amount of water, if the amount is not decreased below what is actually needed for a reasonable rotation. Long years of farming is the best demonstration of what is actually needed, unless they have farmed with an almost unlimited supply of water. Farmers ordinarily will not adapt themselves to good irrigation methods if they have an unlimited supply of water. That is very clearly illustrated by the comparison of the water used on these beats that I mentioned. The type of agriculture and the prosperity of agriculture under Beats 8 and 12 in the Sunnyside is distinctly inferior to that on the average of the other beats.

The fact that the farmer is expending money for pumping would not necessarily be proof that the total amount of water he used was a beneficial use. We have seen evidence in quite a number of cases. For instance, a man might do that for the purpose of getting a larger irrigation head instead of rotating, and that would not necessarily hold, in my experience. In the long run it would be a general indication in that direction.

In determining the length of runs, I would say that if the actual length of run from one head ditch to another did not exceed 20 rods that that would not be out of line for that class of surface. That would be the maximum. If after years of farming and experimenting with longer and shorter runs, the farmers had generally

adopted a 20-rod run, that would not be considered what would be best in those instances, if they had had an unlimited water supply. As I said a short time ago, a farmer will usually not adopt better methods as long as he has an unlimited water supply. He will substitute the extra water for other improvement which might be more profitable. I have not been over the lands out here during the irrigation season when everyone was irrigating. All I have seen of their preparation of runs for irrigation is during the last few days. Quite a number were preparing their ditches and runs. Over-irrigation of the soil near the head ditch on No. 3 lands near Freewater would occur if the corrugations were not properly made and the head of water properly regulated as to size. If a man would run an extremely small head so that it would take maybe ten hours to get to the lower end the chances are he would over-irrigate the upper end. The corrugation, in the first place, should be made with some sort of a shovel plow. I found some of them out here made with a mold-board plow, an ordinary plow, and I would say under this condition that the corrugator should be followed with some sort of a log or appliance of that sort which would smooth it out and to make a smooth, even furrow.

The slope of the land might have some slight influence on the type of furrow. Where the grade is 60 feet to the mile, the rapidity with which the water would flow would not necessarily prevent over-irrigation next to the head ditch. It would depend entirely on how it was handled. I have seen farms in the Yakima Valley with a fall of better than 20 per cent in which they would use such small heads that they would run water there for—

well, I know of instances of thirty-six hours—they would run such a small head that it would waste very little off the lower end and probably not reach the lower end for twelve hours. Under that condition it is possible, even with a very steep head, to have excessive percolation losses at the head end. The particular instance I mention was on a different class of soil, but the soil, as far as the first foot, was lighter and more apt to wash than this soil.

In case of a row crop, I would cultivate this class of soil after each irrigation. It certainly should be done up until the time the growth of the plant reaches a point where cultivation would interfere with it. At that time it would practically shade the ground. I believe I stated that the cultivation should be done up until that time.

If they get in there with an ordinary cultivator and smooth off the whole area, of course, they would be unable to conduct the water through the run, but the cultivation that I have in mind would be largely a matter of simply running a furrower through again and cultivating the furrow itself. If cultivation were the limiting factor it would seep away more, but if your cultivation was such that you did not have a well-formed furrow left, why, then your water would not follow the furrow and your loss would be much greater. I am sure that the porosity of this soil would not be a determining factor whether or not you cultivate. As an abstract question it might be (977).

I made no soil tests other than soil examination of profile for comparative purposes. I made no determination of the soil content and capacity. I made no laboratory tests.

The holding capacity of the soil in the total profile, which the plant would have a chance to use is much less here than in the No. 5 soil on the Sunnyside Division. The soil mingled with the rocks, the soil itself, here is not similar (to that on the Sunnyside Division). (The holding capacity of) this would be a great deal higher. The soil itself in with the rocks here would be a great deal higher than that sand at Sunnyside, but the fact that it is so shallow and the volume is decreased by the amount of rocks in it, makes the water-holding capacity for the whole profile of the soil here less than that sand would be, as a general rule.

I made an allowance for that. I didn't make a percentage allowance. As I believe I indicated, the limiting factor on this soil is the water-holding capacity, but the limiting factor on that (Yakima) soil is the amount of deep percolation that is necessary in order to cover it. It was my opinion that the latter would be considerably of more importance in lowering the duty than the limited water capacity of this soil.

The flowing of water through the furrows tends to silt them and make them carry water better than when you first start to use them. The disturbance of that silted part of the ditch would open up the seal, which would permit it to increase percolation and likewise increase the lateral movement and the speed of subbing the soil. Assume you break the seal and you have a porous furrow, the percolation to the gravel stratum would be much less with a high head of water than a slow stream, because you would get your water to the lower end of the furrow more quickly.

I wouldn't say that the custom of lining or fluming ditches is more general in government projects as a whole than in private projects. It is more general in the near-by government project, the Sunnyside division. I don't know of any particular difference in that respect between government projects and private individuals. I cannot think of any particular instances that would permit a conclusion on that. My experience has not been confined almost entirely to government projects. We have had quite a bit of investigation work on other projects, projects that are partly developed, requiring storage works. My experience would be more nearly confined to projects either government, state or irrigation companies than to private farms.

The government has not adopted a policy of completing the lining and fluming of ditches on the average of the projects; really very few projects, when you consider the total, where this lining has been done.

I would say that in and around Milton it probably would not be economical for the private farmers there to line or flume their ditches to any extent under present conditions, with the exception of the real small, very intensive small ranches; I believe in those it would pay to have some sort of flume regardless of the water supply (982).

I did not notice the pipe line near the tail race of the Peacock Mill on the Little Walla Walla across the gravel belt to the Loundagin tract. I saw very few of the diversion works. I didn't look at them. I didn't observe whether they were tightly built. I didn't observe any waste in that regard. I took no particular observations upon the Hudson Bay Ditch. It is a general thing

over the northwest in the irrigation projects for the amount of production of alfalfa after the virgin fertility of the soil has been used to a certain extent to fall. I know that the production of alfalfa has generally decreased.

The time between irrigations on the 4 and 5 Classes of soil in the Yakima project for orchard tracts, as I remember it, would run in the heat of the summer not oftener than two weeks as a general rule. For alfalfa there were only three or four irrigations per season. For potatoes during the real growing season, after the crop had gotten up in good shape, were usually once a week. That practice was followed for both early and late potatoes. But the irrigation continued longer with the later potatoes, and started at a later time. The year that I was in there I believe the greater proportion was late potatoes (in the Yakima project). The irrigation of alfalfa for only three or four times during the season would indicate that the soil had a large storage capacity. I do not have the figure in mind well enough to (state) how many acre-inches they would apply for irrigation in the orchard tracts there. It would generally be close to 6 acre-inches; depends on the soil. It would be perhaps a little less on Class 4, and considerably more than that on Class 5. The conditions between Classes 4 and 5 are so different that I don't know how to make an average for a class that would come in between 4 and 5. If I may explain, the factors which give the high water requirements to the Class 5 land on the Sunnyside project are entirely different from the factors that would influence the requirement on a fairly tight soil which is shallow. It is not that that soil does not hold the moisture but it is that

the percolation is so rapid that you necessarily lose an enormous amount of water in getting over the field, so it is hard to make that average for the amounts per application. Where the percolation is rapid as it is in that sand, it requires an enormous amount of water to get over the field in one irrigation. I do not consider that that would apply to No. 3 soil around Milton and Freewater. This soil here is heavy enough in texture that in my opinion they can apply light irrigation successfully. The reason it has a comparatively high irrigation requirement is that you have to irrigate so often. I considered in my opinion in that regard the underlying soil and depth of the gravel. My judgment has been based on the understanding that the average, about sixteen inches, is made up of heavy soil in the gravel, and that from there on down to the cement gravel it was exceedingly porous. I don't think that from where the soil ceased to be mixed with the gravel, it would be a cement gravel. I think it is very loose gravel from there down, gravel with coarse sand in it, coarse sand and fine gravel mixture, but very porous, very loose (987).

The percentage of the water applied that would be held in that first 16 or 18 inches would depend entirely upon the way in which it was applied. If the water was allowed to run in those furrows for a long period of time, say twenty-four hours or three days, something of that sort, there would be an enormous loss to the subsoil, but it is my opinion that that can be irrigated very readily without serious loss to the subsoil as far as that one irrigation is concerned. I don't believe that there would be a big percentage of loss through deep percolation if they only ran the water for a period of about three or four hours along those furrows in making their changes.

Assuming an orchard and a cover crop, I would want the length of furrows not more than 320 feet; then I would put in furrows that were of moderate size. I believe many of the furrows that have been used are too deep and has the water down too deep into the soil. These would be smoothed by following the furrower with some sort of an attachment that would smooth the ground to a certain extent. Then it is a little difficult for me to recommend the distance apart with the information I have, but I would think there should be not more than four furrows between the tree rows, possibly three. Then at the head ditch, the head ditch should be kept free from weeds. It should be on a grade, so as to permit a certain amount of silting, if that is possible—it may not always be possible, although usually checks can be put in to control the grade. Those checks are helpful, too, in getting your water out of the head ditch and into the furrow, so it would not be put in entirely for the purpose of lessening the grade. But it would be advisable to have some sort of checks in there that could be handled with a gate rather than to fill that up each time with a shovel. Then I would put some kind of controlling devices, either what they ordinarily call spiles, a tube affair made out of lath, or sometimes you can purchase them made out of tin, or in some way I would have some kind of a metal affair which would keep a constant head, or allow you to control your head, going out of the head ditch into the furrow. Then the irrigation should proceed at a rate—the size of head which should be used would need to be one which would get the water down to the end of that row in a comparatively short period of time, if possible about two hours. I am not familiar enough with the soil

to say just what that length of time should be, but then it should be cut down and new furrows opened and just enough water allowed to pass through there so that there would be practically no waste at the lower end. I believe that the total length of time of from three to four hours in that way would completely irrigate the orchard; that longer periods would result in excess percolation (990).

Where you have a five-acre tract, it would be very desirable to have seven and a half miner's inches for the head, but they have used (the plan I have outlined) on the Sunnyside division with a still smaller head. With a gravelly soil, as the number 3 soil is, I would think you would need a good-size head. I am not prepared to say just how many inches it should be, but if you had a place as small as five acres I would say that you would need to rotate in order to use that amount of water.

I would not be prepared to state just at what acreage I would stop at. On the Sunnyside division I took the use records of the actual delivery to the places as the basis upon which to fix the amount of water required. The actual use was not, however, my recommendation, but it was a basis of it.

The experience and judgment acquired by reason of long farming needs to be considered in fixing the number of applications of water. The judgment of the man upon the ground should not necessarily be relied upon. If you have nearby areas that had amounts of water which vary from that you can get your ideas settled better by comparing. For instance, the use of water in a certain tract where they have been practically unlimited, see how their practice and results compare with the use of water on another tract where they have been limited. I have consid-

ered this phase as well as I have been able to, in the time here. I don't know that I have read all of the testimony that has been produced here in the transcript as to the time of application (of water). I read part of it.

On the Sunnyside division the use records that I considered were gathered by measurements at the edge of the farm at the point of delivery. In that particular land over there, just a portion of the Class 4 was a basalt formation within a very close range of the top. In the portion which was gravelly from the cuts that I examined, the basalt formation was not usually below the gravel part. In the portion of this area which was gravelly, the gravelly strata was deep. There were certain of the basalt lands which had broken up basaltic rock which you might call gravel before you hit the solid rock, but in the area I referred to as gravelly they were alluvial deposits which were not to the best of my recollection underlain with basalt. I made no analysis of this Class 3 soil for fine earth or percentage of stone and gravel. I made no detail examination of the soil in the area near Lowden at the west end of the stream basin. However, we drove over that and stopped from time to time to look at cuts and banks. As I remember, the land in Class 4 in that vicinity was largely salt grass land. I believe there was considerable in 1-D (993).

Assuming that Class 4 in 1-D land had an early water right, and after having observed the development upon Class 3 up by Milton and Freewater, I would say that if the better developed lands were injured by taking the water away, in other words, if we took water away which was actually needed to raise crops, that it would not be an economical use of water.

In the development of salt grass and greasewood land, that class of land is being eliminated to quite an extent from projects at the present time. However, let me explain, lands of that appearance, I have not examined those to the extent that I would know whether I would class them out in the land classification or not.

I have had experience in both types (of water supply) on our projects. Where the supply is flashy, and not of uniform delivery, you frequently use a larger amount of water in the irrigation during high times if you have a soil where you can get storage than you would if you had a continuous flow during the whole season.

The Class 5 land (in the Yakima Valley) which has been referred to as giving some indication of an amount that is greater than I think this land needs, that soil type takes the water very rapidly. I have in mind one instance where I checked very carefully where a farmer was irrigating. He had water running down corrugations; these corrugations were well cleaned out; the water was delivered from a flume. It was running in these corrugations in as big a head as they would hold. He told me the water had been on there for five hours.

I paced the distance, and the water was at that time sixty feet from the flume. It was completely cross-subbed to the top between the furrows.

This Class 3 land we have here, I was told—have gained the impression by talking to a number of the farmers, I should say—that they can run the water through in two to three hundred feet, in their ordinary practice, practically in three hours; that if they wished to use a big head and force the water through, they can run it through in a shorter time.

That gives a comparison of the rates of percolation between those two soils (997).

I would say that this No. 3 soil does not have any unusual soil percolation problems, just from the standpoint of percolation during a single irrigation. It is undoubtedly possible by keeping the waters on a long time to lose an enormous amount through deep percolation, because there is nothing below to stop them. But in the ordinary irrigation practice it can be irrigated with very little percolation losses, in my opinion.

Crop yields are not proportional to the amount of water applied in such crops as alfalfa. The crop yields are frequently increased with increase in water to rather large amounts, but not proportional. There is a point where added water will not give an increase in yield in proportion to the cost, the amount of labor required to apply it. I would not say from the standpoint of the individual irrigation that there was necessarily a point where the increased water would decrease the yield of that particular crop.

I don't believe that the percolation on each side of the furrow will reach out farther in a sandy soil than it will in this No. 3 here, if the No. 3 is in good tilth; I believe this soil will cross-sub quite readily.

The total amount of water per unit of soil held in a sandy soil might be greater than this. But it is difficult to tell, because there is such a variation of sandy soil. The water-holding capacity on the basis of Mr. Larson's figures which he has introduced for this soil is considerably higher than a great many sandy soils.

I considered the evaporation losses of the Milton-Freewater (lands) as well as I could. I would see no

reason to believe that the evaporation losses up there needed to be unusual; however, I don't claim to have any regular data on that subject. I did not examine the data book (Washington Exhibit 18) in detail. I looked for the tables giving the relative humidity and evaporation in and near Walla Walla in the weather records which I have here, but I didn't find them in these records.

The July evaporation in 1932 of 10.617 inches, and in 1933 of 11.335 inches, shown on page number 2 of Washington Exhibit 18, is not necessarily larger than I considered. I have simply considered the evaporation as a relative proposition. I have not attempted to put any definite figure on the evaporation from the Freewater surface.

E. C. BURLINGAME, for the State of Oregon, testified in part (458-509):

Upon statement of counsel for the State of Oregon that the testimony of this witness was being offered to attack the validity of the priority of the right of the Gardena Farms District, the State of Washington interposed the following objection (459):

"The Washington decree, being Washington Exhibit No. 11, the general official map, being Washington Exhibit No. 17, the stipulations on file, and the testimony so far taken show that the Gardena appropriation from the Walla Walla River in Washington is Claim No. 570 of the Washington decree, by which decree the State of Washington recognized and established the appropriation of the Walla Walla Irrigation Company as a vested nd accrued right in said company to a priority dated 1892 and issued a certificate of water right to said company further evidencing the same; that the Gardena Farms District No. 13 has succeeded to all the rights of

the Walla Walla Irrigation Company recognized and established by said decree and said certificate of water rights; that the Walla Walla River is an innavigable interstate stream flowing within the boundaries of the two states involved in this action, and under the facts and the laws of Congress the State of Oregon cannot in this controversy in this court question the validity of the Gardena appropriation or its priority date, and the State of Washington objects to the introduction of any evidence to that end as not being material or relevant to the issues involved herein."

THE SPECIAL MASTER: Of course, the Court would have some trouble—I think the objection is properly in the record at this time, but I cannot pass upon the testimony until I hear what it is about—it is anticipatory—but the testimony of this witness as addressed to the subject indicated by Mr. Paul will be received subject to the objection and he need not repeat the objection as the testimony is offered.

The witness resumed (460):

In 1892 I came here to look over the survey of the Walla Walla Irrigation Company's canal and report to them on it. I took an engineer, instrument man, and two assistants and we drove to the intake of the survey and started to check their line. I had the map of the old survey with me in my hand, and I looked at the map and I saw that the survey went north, zigzagging around those rough hills toward the Whitman Monument and back in every direction until it came to within a few hundred feet of where I stood. That made me think that perhaps I could shortcut that survey, and I went back to the Little Walla Walla, and the engineers had just reached that point with their work.

I asked the engineer to drive a hub so as to hold his grade line and run the trial line over the saddle to me. He did so, and to my surprise in 1700 feet I found I was on top of the ground with the water grade of the ditch.

Then we went on a little further with the instrument, maybe a thousand feet or more, until we could get a full sweep of the country to the west, and we saw that there was a large valley, something like a section or more, that was all under the grade.

(462) I made my report to Mr. Boyer. They verified what I have just stated and asked me to become one of the company and to look after the building of the canal. Actual construction work was started in 1892 by a man with team and scraper and in a short time in that year I shipped in a grading outfit, put up my camps and went to work on the canal.

(473) I finished the Kennewick job in February, 1903. Prior to that time I had a map made and I had engineers make surveys. I had the old map. I had to have a survey go ahead on the line of construction before I could do the work.

(474) I had E. H. Guilland's map—that is the original survey. (Oregon Exhibit 33). I had been out over the line of the ditch as originally drawn upon that map. I had the survey made. I was there every little while. The line of dots beyond the letters "W. W. Irri. Co." has been added by somebody and was not made by the original engineer. When I originally had that map those dots were not there. The dotted line running down across the state line into Oregon southerly and westerly, then westerly and northerly and westerly clear over to the stream marked "Walla Walla River," on that map was

the original plan as furnished to me by the Walla Walla Irrigation Company before I became a member, with the exception of the change in the canal line west of the Little Walla Walla. Oregon Exhibit 34 is just simply a blueprint of the original survey. The proposed main canal was changed in 1903. The words and line in white ink on Oregon Exhibit 35 must have been drawn upon it after the original blueprint was made. I do not know who did it nor when it was done. Without those changes the blueprint (Oregon Exhibit 35) correctly delineates the original plan of the Walla Walla Irrigation Company canal. The present construction is about as outlined in the changes on the blueprint (Oregon Exhibit 35).

(482) I made the change in construction from the original blueprints to the present construction in about 1903. I discovered by looking over the land that we would leave what I considered the best portion of Gardena without water if we went ahead with our plans as originally made to build our ditch. They could not have been irrigated under the old main ditch as originally planned. The best lands are lands in the east end of Gardena on the highest altitude in Gardena covered by the pipe line. Two and a half or three sections of that land could not have been irrigated under the original plans.

(483) I think in the winter of 1903 or '04 we had decided that it would be best to cover that land and shorten the construction of the canal, and we figured that it would save water, get more land, that the land there would pay the cost of the construction of the pipe line.

(501) The west half of section 11, township 6 north, range 33 east is a mile lacking two to three hundred feet directly west of where the siphon empties into the Gardena canal in the southeast quarter of section 12, same township and range, which then flows west through the east half of section 11. Section 12 is the highest land in the Gardena plateau irrigated by gravity flow. A portion of section 11 is very little below that elevation; the north part is higher. On February 11, 1901, Elizabeth S. Burlingame, my wife, made a desert land entry on the west half of section 11. On January 4, 1893, I made a desert land entry on the same land.

(629) Washington Exhibit 36, showing the United States Land Office record of desert land entries on the west half of section 11-6-33 was admitted in evidence, as connected with the cross-examination of E. C. Burlingame, it being admitted by counsel in open court that Rhoda M. Burlingame, named in the exhibit, is the daughter of said E. C. Burlingame.

The witness resumed:

(504) I was a witness when the rights to the use of waters of the Walla Walla River were adjudicated in Washington. The Gardena right was contested by lower users on the river. Attorneys representing contestants cross-examined me rather thoroughly at that hearing.

(506) Before 1917 and since I have had control of the management of the Milton-Freewater and Hudson Bay Irrigation Company. I knew when their filing was from the river. I am farming a large acreage that is being watered now by that company.

WILLIAM FORSYTHE, for the State of Oregon, testified in part (525-542):

(529) I have four wells. The water rises in them in February or March. The rise continues a month or six weeks. In the summer time I have water very near the top of the well. It rises very near to the top in May and June. My wells average about 36 feet deep. The cement gravel in some places comes 10 to 12 feet from the top. Above that the soil is loose mixed up with rock and soil for the first foot or two.

(538) I dug the first well in 1896 or '7 and began then to use it for irrigation. I dug another well in 1906 or '7. The rise and fall in the first well has been about the same since it was dug. I get part of my water for irrigation from the Ford Branch. I had what they call a flood water right. I have my pumps on windlass platforms that have to be lowered a number of times during the summer as the water recedes in the well. That is true with all the wells I know of.

Elba Rogers, for the State of Oregon, testified in part (543-581):

(550) After they start to irrigate the water in the wells in my community will increase and later in the season when the evaporation is so great, it will decrease. I have a well 108 feet deep. I use it only when a short water year compels me to make up my water supply. The well is dug 38 feet and drilled the balance of the way. There will be somewhere from 7 to 10 feet of water in the dug well and after I start to pump it is only a small while until I am taking out of the drill hole. If I should cease to pump, it would take less than 2 or 3 hours until the eight-foot level in the dug part would refill. The diameter of the well is about 4 feet over. (577) I used it last 3 years ago. I can't recall when the well was sunk,

it was about 1912 or 1914, something like that, as near as I can remember.

(552) I have dug many a well. We start in at the top, and if you happen to start in a good place perhaps you will have a foot of soil, but as a rule it is gravel to start with, and that is generally from 8 to 12 feet thick before you strike what is called a cement gravel. As a general rule, after you get down 2 or 3 feet something like that, clear on down to the cement gravel, there is hardly any soil, it is porous. We have to curb that before we go any farther. There's places in that cement gravel that we call veins, that's full of water, but in the spring time the water stands up inside of our curb, which is from the floor on top of the cement gravel.

(557) I have five acres; three and one-half acres in tomatoes. The furrows run lengthwise about three feet apart. We cut that in two blocks about 19 rods long. We are on a three-day rotation. (564) I apply the water 24 hours out of each three days. (571) I get two other water heads besides my own. We have a head ditch across the upper part of the place and a cross lateral about the middle of the place. The water comes through this upper one, we will start in, say, on the east side, which is the higher side, we gather the water at the lower end of this other and irrigate on the west side with that tail water from the upper one. The tail water from the first eight ditches is run into the cross lateral below what we call the tail ditch and carried across to the further side of the patch. We irrigate from the center down with that. We irrigate about ten ditches at a time on the upper part and a half to a third as many on the lower part. (576) I believe I get my water from the west

branch of the Crockett. (566) The depth of the root of the tomato plant is about 10 inches below the surface to which the water is applied. The roots that go down that depth supply the vines. The roots closer to the surface, spread out, get the water and supply the fruit.

ALTA ROGERS, for the State of Oregon, testified in part (595-629):

(601) The first work done up at the divide of the Little Walla Walla to my recollection was along about 1890. That work was done every year from that time on down. In doing that work I would judge that about half the water was turned into the Little Walla Walla. We always left water enough run down there for East Side, and we merely guessed at it so as not to overdo the thing.

(601) I irrigate 15 acres. I have a main head ditch across the upper end of my ground, and my land lays—there's ten acres of the land that is 80 rods—80 rods running east and west and 20 rods north and south; and then I have five acres—my land lays in an L-shape—I have five acres that is 40 rods east and west and 20 rods north and south, and with my head ditch I have a lateral that comes out of the head ditch that covers every two tree spaces, which is eight ditches, and I take out of the head ditch into those laterals and run it through the eight ditches and catch it on the piece of ground north on the ten acres and use the tail water on that as much as possible so as not to waste any, and my laterals—or my ditches are just 20 rods long on the whole piece. I have water there for ten acres out of the creek and then I run a 2-inch pump. I rotate with the man above me, who has 5 acres. He gets it 2 days and I get it 5. I have a well six foot square 43 feet deep. Water seeps through veins

in the cement gravel. When I went on the place in 1913, the well 20 foot deep was there. I started in to deepen that well about 1916, 1917 and 1918. I had to deepen it several times. In the spring when they start irrigating the water will raise in the well up to the curb, within ten foot of the top of the ground. In the winter it is dry. (616) After they start the irrigation my well rises rapidly. The water comes on top of the cement gravel as near as I can tell, because it will run clear up to the curb in the loose gravel. It starts in at the bottom of the well. It is bound to start in on that, where it starts in and comes out. After it starts raising from the bottom it will come in and run down on the walls until you can't get down to the bottom; you have got to cover your pump up with something to keep from ruining your motor. (610) I mix my pumped water with my creek water to make me a better head, so I can get over my ground. The inch and a half per acre, combined with the water I get from my neighbor is not a big enough head to irrigate my land during the irrigation period. I run 4 rills between each row of trees which are 25 feet apart, two rills on each side. The first rill is 2½ feet from the tree. I used to run 5 rills but my water was so short through July and August, I had to cut it down to two on each side and cut out my center ditch (rill). I try to run 8 rills at a time. (620) During July and August I would say that maybe the majority of the time I get two-thirds of my amount of creek water.

(618) The water flows through this connecting channel between the Crockett and East Little Walla Walla during the fall, winter and spring. It is only during the dry season that this channel goes dry. That is also true

of this so-called connecting channel between the Ford branch and the West Little Walla Walla during the fall, winter and spring, water runs continuously down through there but during the dry part of the irrigation season that part of the channel is dry.

WARREN ROEDER, for the State of Oregon, testified in part (636-677):

I was assistant water master from the spring of 1913 to 1919 in charge of the distribution of water on the Walla Walla stream in Oregon.

(639) From the line between sections 25, 36, 35, 26, 27, and 34, township 6 north, 35, on down there was practically no channels in 1919. They were in places a foot and a half, they would narrow down to a foot and a half; there was willows, alders and brush all the way from 4 feet to 20 feet aside of the streams, these channels that went down. All the channels had a reach that was dry in the summer. The Crockett; the Ford—all the irrigation channels that we diverted water into; we dried up the Tum-a-lum, and all the channels that we run water down into were all dry at the end. No water during the summer time would go down either the Ford or Crockett branches to reach the State of Washington. (675) I wouldn't say some of it didn't get through during the year 1913; I would say it couldn't a whole lot get through. (640) The first year I was in, owing to the condition of the divides and the headgates, we spent the biggest part of our time taking the water down to the ends. The men at the ends would haul in loads of dirt and put across, manure and dirt, and put across those channels so that there was no water went below those adjudicated rights by the court. The water would come down to where those

channels narrowed down and then it would just flood out on the places. There was—the place that I had bought, finally bought, that was just a lake every winter and spring, owing to the fact that these channels were so small that the water couldn't get through. We straightened out the channels in various places, and their theory was that allowing this brush to grow on these creek channels saved the water, the evaporation, and, of course, naturally they didn't get any water down there to speak of in the summer because the fellows up above was taking all the water, and those channels were plenty wide enough to carry the little amount of water that would go down to the lower end of those branches. After we went on and got in the divides and proportioned the water so that the lower ranches would get more water, the ranchers immediately started opening up those channels and taking out that brush, they had to open up the channels, to get through to the channels so they could open them up. In some instances the channels were moved from the winding channel across their property to the border line, straightened out and enlarged three to four times as large.

(642) We put in the Frog at the lower end of the tail race of the Peacock Mill. It was a concrete divide high enough so that we could halt the water into the channels. The water is regulated into the channels with screw gates. The irrigator's water is measured to him on his place. (665) I said that this water was measured on the land. Wherever we run water from the creek to a man's place, if he didn't keep that creek cleaned out, why, we just cut down on his water and forced him to clean that ditch out. Whenever he had a good ditch, that we seen

was as good as he could fix it up, then we would take measurements at his place and allow the seepage necessary, but if he didn't attend to that ditch, why, we would just refuse to charge it up to the other water users and charged it up to him, so we forced the issue through.

(644) The first year Mr. Reineman (the water master) was located at Pendleton, and he would come up—he would notify me the days that he was coming up, and we would work on one stream and then switch over to—or one branch, and then we would switch over to the other branch and we would work on that for a day or two days at a time to determine. We cut the proportional weir, then we would go down and measure what each water user was getting and what amount of water was going through the main creek; then we had strips of galvanized iron about two feet wide, he would have his instrument with him, and we would level the bottom first and then we would measure what was going out to the water user and what was going down the main stream, then we would make a notation of the seepage and evaporation loss from the Frog down to that place, then we would take and work from that on down. The first year we spent practically two days of every week checking seepage and evaporation. The first year we added 15% to 25% for seepage and evaporation. In later years we changed that from 10% to 15%. We reduced our seepage and evaporation losses from 20% to 25% to 10% to 15%. The year I went off (1919) I put in the last main divide, what we called the Overturf divide.

(649) When we went on the divides—a water user would always see that the main creek was as tight as he could get it, but his headgate—we would have the weirs

in, but when I went on there, where they would tighten the main creek weir and see there was no seepage and leakage underneath them, they would never do that on their weir, so consequently some of them was getting as much water underneath and around their weirs or boxes as they was getting through the weir itself. When I went on the measuring devices were all wood. There was only one concrete headgate on the system, that was the Stillman headgate was on in concrete when I went on. All the rest was wood. Consequently the upper men were getting from an inch and a half to three inches of water, the lower ends were getting from half an inch to an inch, and all of the lower men, practically,—the biggest part of them, had wells, which they would use to get water sufficient enough to irrigate with.

(653) There are sections of my place that until the last two or three years I would turn a full ditch of water into one of the laterals and it would go down a part of the way and then it would just sink away. I would carry manure and dirt and throw in there, and get in with my boots and tramp back and forth until I would get that water going over that spot; then it would go down maybe two rods further, and have the same condition. I would work it down—maybe I would get two-thirds of the way down—understand, these laterals are none of them over twenty rods long—before I would get to the end of that twenty-rod lateral it would break out where I had got it over before, so I would have to go back up and work it down.

When I started irrigating it was just a matter of camping right with that water from the time I turned it into a number of laterals until I got it through, then I

would have to see that it went through. I irrigate 5 or 6 rows, a little over 3 feet apart, at a time in the cherry orchard, and 6 or 8 in the prune orchard in the low season. I cannot rotate with any person unless I would make my tail ditches and head ditches a great deal larger than what they are today. I haven't up to the present time used a well to supplement my supply. In 1933 I had a little over 2 miner's inches per acre in the last of March and the first of June. In the last of June 1½. In July it dropped below 1½ and in August it was just about up to the 1½ miner's inches again. My place is located on the West Prong of the Ford branch. The main Ford branch is east of this prong, which now runs around my place on the east side.

AUBREY E. PERRY, for the State of Oregon, testified in part (678-701, 853-861):

(685) I have made computations of seepage losses in the Ford Branch system taken from my report to the state engineer in the year 1918. The study down the Ford extends to the Charles Schwald place, 2 miles from the Frog. The total distance covered on both branches of the Ford was 4 miles. The study was made in July. At that time the farmers were diverting and all the water in the Ford Branch was being used for irrigation. The amount at the head was 18 c. f. s. The total loss in the 4 miles of the entire stream system was 32%, being an average main channel loss of 8% per mile. The method of determining that loss is to measure the amount of water flowing into the head over the head weir, then going along and measuring every diversion out of those channels, and then subtracting the amount that is being

diverted from the total at the head. That gives you your loss—actual loss.

(688) The various branches of the Crocketts run through the same kind of soil and the same territory. I do not have my figures upon either of the Crocketts. The only thing I have with me is what we call our weir cuts, figures on that, which show the total loss through there. Over a distance of 2 miles, the loss runs between 15% and 20% for the Crockett branches. The average would be close to 8% per mile.

(854) All the pumping operations from wells from which irrigation water is pumped are for irrigating the overlying lands owned by the owner of the well. (855) When the flow at gauging station 212, a half-mile below the forks of the river, is from 185 to 200 feet, and all the water in the river is being diverted between that point and the Hudson Bay intake, the Tum-a-lum is generally dry.

W. C. Mason, for the State of Oregon, testified in part (714-741, 1135-1146):

(714) From 1921 to and including 1933, I have been a water distributor or water master, in one capacity or another, on the stream (in Oregon). I am at present under James M. Spencer, district water master.

(715) We usually start regulating the distribution just as soon as the water becomes short, and the irrigators start in to making a general use. The years are different; usually some time in May or June, depending upon the season. We usually make pretty careful adjustments below what is known as the old West Bridge, approximately a mile below the forks. Above that I am

duly subject to call and have had only a few calls for any regulation up in that district; and I have made several investigations on complaint of other users as to the quantity of water used and its direct effect upon the stream system.

(716) I found that up to a reasonable use that the use of water by those irrigators above did not interfere with the general stream system. We did find that at the time they first made their diversions, we noticed a lag in the stream for a few days (three or four days), and have tried to encourage an earlier use so as not to catch that at the critical period in the lower district.

(722) I have observed the river as to freshets. I know in June, '27, we got one that came down within a 20-minute period, the river raised from 125 c. f. s. to 1000 c. f. s. The peak of that run-off was down by morning. (736) We are subject to the sudden rise and fall of the stream during May and June. When the snow on the mountains is hit by the warm winds, really hot days, hot weather, we have pretty heavy run-off. That run-off there on that water shed seems to culminate at about the same period. We get as high as a drop of twenty-five second-feet a day during the years, that is the general rule, along the later part of June, when that last run-off —when the melting snow seems to have ended we get those drops nearly every normal year.

(726) In controlling the water at the Frog for sending it down each of those branches to the water users, we have been allowing 15% to 20% for seepage. I refer to that as a general per cent of seepage. In the spring of the year when those streams are carrying heavier heads of water and the ground around the banks is full of

water from rains or winter snow there doesn't seem to be quite the loss that there is during the dry seasons and when the weirs are all in. The putting in of the weirs increases the loss in the stream. Owing to the stream system there, the fall in the land, and the individual water users taking water from the channel have to raise the channel, and especially the type of weir system we use, the overflow weir with clearance below the weir, sometimes making heads up between the streams on these gravel banks and the ground is usually dry along the banks, there seems to be a loss there. The putting in of those diversion dams or weirs in the channel of the stream reduces the carrying capacity of those stream channels. Of course, the lower parts on those streams, those streams being a system of their own there and the water being adjudicated to that particular section, we have practiced, and it has been practiced before I was on, putting in a system of proportionate weirs; owing to slight fluctuations in the stream it has been the most equitable distribution from that type, and they are rectangular contracted proportionate weirs, consequently, when you get down to the smaller tracts, or the tracts with the lesser number of acres on the lower reaches of the stream, your main weir boards will be cut sometimes fifty-fifty with the laterals where the irrigator diverts on to his land, and the stream with those weirs in would be, on the lower end, would be reduced probably fifty or seventy-five per cent of its carrying capacity.

(728) Most of the weirs were out in November and December, last fall (1933) when Dr. Woodburn made his test for seepage upon the Crocketts.

(735) The number of acres on the gravelly land that can reasonably rotate depends somewhat on the size of the tracts, of the individual tracts and the type of crop they have on the land. If they have just orchard land —we have some rotations as high as fifty to sixty acres that work out very nicely. Where they have tomato runs, seems like twenty-acre rotation system is about the most satisfactory.

(1135) I am required to make 160 diversions from the natural channels of the river for supplying Oregon rights.

(1136) We use proportional weirs upon these different channels.

(1138) If there is a surplus over the amount that the users are entitled to, it is proportioned among the users according to their rights for whatever length of time the surplus continues to run.

(1138) All of the rights, below that gravel fan and below the dry places upon the Ford and Crockett are supplied from springs during the irrigation season. They get some of the water, I believe, in the spring before the headgates are in. There's water feeds on there after the Peacock Mill Company has a right, and that water feeds on through before irrigation season is generally started.

(1138) When there is a surplus in the stream over all rights, I make no measurements to the users, as long as the rights are supplied.

(1141) In the event that there is an over-diversion into the Milton ditch and the water runs down past the end of it, it is picked up by the Finis Irrigation Company,

which irrigates approximately 107 acres down there with that waste water and the well.

(1143) When I am turning water into those natural channels such as the Ford and Crockett, I make an allowance of 20% for transportation loss. I allow 20% on the East Side Ditch for transportation loss. It is approximately 2½ miles over for the East Side users.

(1145) In regulating the stream for rights below Milton, I regulate the East Side Ditch and the Tum-a-lum Ditch and the diversion at the Red Bridge, and there's Stillman, Perkins, several other small users, along the Little Walla Walla, and the headgates at what is known as the Frog, and the Powell Ditch headgate, and the diversion weirs, and then the numerous small weirs up and down the East Crockett Branch and the West Crockett Branch and the Ford Branches.

ARTHUR M. PIPER, for the State of Oregon, testified in part (761-804):

(763) Washington Exhibit 16 is the report which I made upon ground water study of the Walla Walla River basin.

(764) Let me first go back to the form of the bedrock which underlies the basin and is the base upon which the valley is built. The outcrops of that bedrock are on the map (Plate 1, Washington Exhibit 16) colored green. They extend entirely along the north, closing around the west except a very narrow gap through which the stream escapes, continuously along the south. That rock is folded in the form of say a canoe-shaped basin, the deepest part of which is in the region between Touchet and Lowden and about on the state line. There that dense

bedrock as shown by the records of drilled wells is first reached somewhat below sea level and several hundred feet below the land surface. From that deepest portion the bedrock rises in all directions, so we have sort of a canoe-shaped depression. In that canoe-shaped depression of the bedrock we have various deposits, formations, laid down by streams, which make up altogether the valley proper, we might say.

(765) The oldest of those stream-laid deposits, or perhaps I better say water-laid, is delineated in the report as the deposits forming the Gardena terrace. On the map (Plate 1) they are discriminated by this orange color. In the southwest portion of the valley, where Gardena tracts are located, the terrace is approximately 125 feet above the flood plain of the Walla Walla River. As we come eastward the height of that terrace above the flood plain decreases. Opposite Milton it is perhaps 40 feet. As we come still further eastward and northward in the Mill Creek valley, it comes down nearly to the level of the flood plains. Initially that terrace covered the entire basin. It was a smooth, continuous plain. It comprises two fans in form; one with the center about the present canyon of the Walla Walla River at Milton. Another with its head near the present village of Tracy on Mill Creek. Those two fans declining westward, merged together in the vicinity of the place where the Yellowhawk now joins the Walla Walla River, in rather a flat, smooth plain, which continued across the rest of the basin.

(767) Mill Creek and the two heads of the Walla Walla have been the major streams, major headwater streams, of the basin for a long period, even prior to the

building of this plain. That plain in this upper part, the portions that are exposed, is built of relatively fine stratified material. That material is relatively fine, rather tight and would not transmit water rapidly. After the formation of that Gardena plain, the streams have cut into it, first cut down, and have formed the trenches through which the various streams now flow. Towards the heads of the two fans, that is, in the vicinity of Milton and Freewater and in the vicinity of the City of Walla Walla, the streams almost completely cut away the top of that old terrace. In a later stage they began to deposit gravel in the valleys which they had previously cut. The end product of that process has resulted in two formations distinguished on the map, one termed low terraces in the report, shown on the map (Plate 1, Washington Exhibit 16) by this brownish-yellow. Those terraces extend but little above the flood plain, nowhere, I would say, much more than twenty feet, and commonly five or ten feet, above the flood plains. They seem to be formed, also, of fine material, relatively water tight. Somewhat below those, and the youngest formation of the basin, is the coarse gravel forming the fans at the mouth of the canyon of the Walla Walla River and at the mouth of the canyon of Mill Creek, which extend outward as tongues, or fingers, perhaps, one along each of the streams, much like the pattern of one's hand, and separated by remnants of that high terrace which project in between. That gravel fan rests on and overrides the tips of these remnants of the higher terrace. That is the Gardena terrace. The flood plains which continue on down are built of similar material to the fans, but becoming progressively finer. That is the normal condition of a deposition by streams.

That briefly describes the three sedimentary formations which together form the valley floor.

(769) We have records of a number of drilled wells given in the report which give the total thickness of material resting on the bedrock. In well 551, B-2 (Plate 1) located in section 1-5-35 just south of the railroad crossing and just west of the river, owned by Milton Nursery Company, bedrock was encountered 348 feet below the flood plain. A well in section 8-6-35 labelled Q-1 on Plate 1 encountered bedrock at 175 feet. In a well owned by Shields Fruit Company in section 33-6-35 designated N-1 on Plate 1, bedrock was 413 feet below the surface. The well in section 31-6-36 designated on Plate 1 as K-1 encountered bedrock at 417 feet.

(774) In Plate 5, Washington Exhibit 16, we have shown the form of the water table at two periods, one approximately June 20th, 1933, and the other about August 29th, 1933, as the measurements upon which those lines were based were taken within a few days of those two dates, it being not feasible to cover every well in one day. The first period is that when the wells within a few miles of Milton and Freewater on the fan stood their highest for the season as we observed them last year, the latter period, August 29th, when they were about at this lowest point within that period, the lowest point following the peak of June.

The form is shown by contour lines drawn on the water table. For instance, the line here designated "750" is drawn along the water table so that everywhere it is 750 feet above sea level. The next line, designated "800" is so drawn that everywhere it rests on the water table

where it is 800 feet above sea level. That is 50 feet higher than the next contour to the west.

(778) That model (Oregon Exhibit 38) is of the same map as Plate 5, Washington Exhibit 16. I have taken the negative copy from which the prints of Plate No. 5 were prepared. I have divided it along each of its contour lines and pasted each portion on a thickness of heavy card so at each contour it steps up the thickness of the card, which you may take as representing the contour interval of fifty feet, so that the form of this relatively shows the form of the water table; if we imagine those rectangular steps are smoothed in. We can see from that where the contours are far apart, the grade between them is relatively gentle; where they are closer together, the grade is steeper.

The water in the gravel beneath the water table would move or percolate exactly as though it were surface water flowing down a hill of this form. In other words, it will move directly down the slopes. So on this map the ground water at any point is moving at a right angle to the contour line, and from the higher contour—the contour of higher number, towards the contour of lower number, designating the lower altitude.

If the gravel is of even texture throughout, the rate of movement is proportionally to the grade, or it is inversely proportional to the spacing between the contours. Where the contours are far apart the grade is gentle, the water is moving relatively slowly. If the contours should be half as far apart the grade would be twice as steep, the water would move twice as rapidly.

So the spacing of contours on the map and slopes

on the model indicate relatively the rates at which the ground water at the water table is percolating.

(779) The condition when the high water comes down so that there is water flowing on the surface in the stream bed for the full length of it, is represented by the period of our early contours, June 20th. That date was just as the spring freshet in the Walla Walla River, the Tum-a-lum fork, was declining.

At that time the contours of the Milton-Freewater fan are roughly circular, about a center up here—an apex in the vicinity of Milton.

The water table also rose both from the east and from the west in that distance, and was highest at the Tum-a-lum fork. If we take the grade of the water table between wells adjacent to the river and project that grade forward it indicates that the water table would very nearly meet the water surface of the river.

Records which we have taken on observation wells which we have measured frequently near the river rose and fell in a pattern which is entirely similar to the rise and fall of the stream, so we conclude that the ground water, when the river is continuous, that the water in the stream rises and falls as the river rises and falls.

Because those contours are circular, because of the model which I may hold in the same position, their form is roughly conical, the water which would seep away from the river and become ground water high on this fan could percolate radially outward directly down that slope over practically the entire width of that fan. In a conical form—rudely conical—water which left the river high on the fan in the vicinity of Milton and Freewater, if it per-

colated radially outward, could pass along the westermost edge of the fan, some of it nearly northward, some which would come directly down the slope would pass northwestward.

Within the limits of our mapping we did not have observation wells on the high terraces on Gardena terrace east of the river, so I do not know how far eastward that conical form extends. It does extend to the terrace where that rises from the gravel fan up to the Gardena terrace. So far as those measurements are concerned, it would be approximately symmetrical to both the east and west sides.

(781) From a point in the Tum-a-lum, approximately half way between the Nursery Bridge and the McCoy Bridge—that is between the 900 and 950 contour levels shown on the model (Oregon Exhibit 38)—water leaving the river northward would be more constrained as to the area within which it could percolate. It would be bounded by radii drawn through that point right down the two slopes at right angles to the contours. The area within which we would have free percolation would roughly include the drainage basin of the East Little Walla Walla and would extend westward nearly to the West Little Walla Walla. A radius starting at the Nursery Bridge and drawn at right angles to the contours would intersect the state line nearly at the west boundary of section 15-6-35, and the seepage would come in part within the area of the West Little Walla Walla.

(793) Along the higher part of the fan, the percolation of the ground water is unrestricted by these remnants of the Gardena terrace, but as we pass outward the

alluvial gravel separates into these several fingers which pass between and which rest on a floor of the material forming the Gardena terrace. In other words, our gravel, which relatively is highly permeable, is breaking up into tongues which are separated by relatively impermeable material. Those tongues rest on a floor of some relatively impermeable material which from below is narrowing the thickness of the young gravel. The net effect is to reduce greatly the area of cross section in that gravel through which the ground water can move freely. That is about three miles northward and westward from Milton, which would be along the tips, along the eastern tips, of those remnants of the Gardena terrace. There is perhaps about four miles of width in that gravel through which the ground water can percolate. A mile further out that width is reduced, aggregate width of those tongues, perhaps half that, so that it is constricted in width, with the greatest constrictions toward the west. As was pointed out earlier, those are the least distinct and narrowest channels and have the least of the young gravel fill.

(794) Just at Milton and Freewater the contours indicate a rather dispersion away from the stream. As you get farther north to the 800 contour on the north, the 800 contour and the lower contours have a similar form in that they trend somewhat west of north to the north of the Walla Walla River, but as they cross the river, (they) swerve sharply toward the west and southwest, so that on Plate 5 they have a general V-shape with the point of the V beneath the river. On the model a form analogous to a valley. If water is moving down the slopes, then, there it converges toward the river, both

from the north and from the south, along both sides of that valley.

(795) That would indicate that from the 950 contour about to the 800 contour, the stream is in general a losing stream. From the 800 contour (northward) the table slopes towards the stream from both sides so the water moving inward to the river (the stream) would tend to gain.

(785) The greatest fluctuations of the water table we have observed are in the district shown on the contour map (Plate 5, Oregon Exhibit 38). I wish, though, to make clear that this is not a depression in the sense that there is a continuous northward slope across it. It is not a cup-shaped hole in the water table. Because the water table is steep, because it rises 50 feet between those two contours, if it declines only half of that amount in between it is not sufficient to put a depression in there. There is a steepening of the gradient to the south, then a flattening, but nevertheless a continuous northward slope; then beyond that district is a steepening again. The gradient is not reversed so that the water is drawn back from the north. Its normal direction of motion is not reversed.

(789) Our observations have shown that the water table rises in some wells in response to the river, as I have just explained, in response to irrigation nearby, that is, the spreading of water over crop land near the well, and in response to rainfall, that those things will be reflected in some wells by the water table rising, that the water table will fall as pumping becomes general or as the river declines.

(790) None of our data would show the effect of evaporation and heat on the water table. The effect would be slight, would be obscured by so many factors it would be difficult to show. The natural regimen of the basin is such that more than one of these agencies causing the water table to fluctuate will be active at the same time. Irrigation naturally begins in the spring, when there is water available in the river, so that in the year 1933, as we have observed conditions, at about the same time the river was rising and wells nearby were rising with the river, water was being spread rather widely because of irrigation, and although in some of the wells we can detect portions of the fluctuations and relate them to the application of the irrigation water, it is impossible to say what fraction of the total rise is due to the river and what to irrigation. Conversely, on the decline, naturally the pumps are turned on as the supply available for surface irrigation declines, which is as the river declines, so that the depression of the water table due to pumping in 1933 began soon after the water table had begun to decline because the freshet had passed down the river. Our data does not justify an estimate of the portion of the total fluctuation that is due to these several causes, because the causes are working coincidentally. It is my judgment that the greater part of the fluctuation is related to changes in discharge of the river.

(792) At the time represented by our late contours this low point of the water table, perhaps, a slightly greater portion of the total movement was in the eastern half of the fan, say, slightly greater portion, than there had been at the early period. It would tend to divert—that is, if it were fifty per cent at the early period there

might be slightly more than that at the later period, because of greater steepening along the east side. That is a suggestion from the evidence we have. That to that extent would cause relatively more of a flow to the northward than to the westward.

(796) In our report which is Washington Exhibit 16, we list the springs which were found in the canvass made under my direction last summer, and we segregated those into three groups or three zones on the ground, so-called inner zone, which contains most of the springs, and which is roughly between the eight hundred foot and the eight hundred and fifty foot contours as drawn on Plate 5. The springs are arranged in a zone from half a mile to a mile wide, which is approximately circular. Beyond that there are fewer springs, arranged in what we call an intermediate zone, between the seven hundred and seven hundred and fifty foot contours on Plate 5, and in the outer zone, which is between the six hundred and six hundred and fifty foot contours, mostly the springs by far being in the inner and higher zone.

(797) In this valley my conclusion has been that the constrictions caused by the Gardena terrace remnant, the constriction of the permeable gravel has been so great that the groundwater under given conditions is not as free to percolate beyond that constriction as it is to the south of it. Therefore the constriction acts as a partial dam, retards the water, forces some of it to the surface, so it breaks out at the low points and forms these springs.

(797) The application of irrigation water is rather general over the whole fan. As I pointed out previously, our data did not permit saying what portion of the total

fluctuation of the water table is due to irrigation, although some of it undoubtedly is.

It has not been possible from the data now available to show that the form of the water table in any major feature is the result of irrigation or is the result of pumping. It is my judgment from that, therefore, that the general pattern of ground water circulation is a natural one, modified partly, perhaps, by irrigation water and by pumping, but not to a major extent. Our data does not permit saying to what extent.

(801) Figure 4, following page 67 of Washington Exhibit 16, is a profile showing the slope of the ground surface and also the slope of the water table at different periods. The diagram is drawn as though we could divide the country along the state highway extending northward from Freewater to the state line, removing the eastern portion and could look at it from the east. In other words, as we look at it, this would be a cross-section of the fan along the face of a north-south cut, viewed from the east side. The upper left-hand corner of Figure 4 is towards the head of the fan identified by well 552 B 1. That well is designated on Plate 5 as B 1 in section 2-5-35.

The springs discharge where the four profiles come nearly to the same altitude and where there has been little fluctuation in the water table somewhat below the 850 contour, slightly north, where the spring is designated by number 6523, P-12 on Figure 4.

(799) This stream system is spoken of in my report, Washington Exhibit 16, as a simple water table condition. The sources of water supply here are just the

drainage area in this Walla Walla Valley. Those springs that break out in the area beginning about 3 miles north of Freewater and extending on down to the state line along the Walla Walla River and in the lower Tum-a-lum are supplied by ground water. During the summer season, the ultimate source, so far as I know, of the stream flow in these spring branches from the springs to the north of Freewater and in the Walla Walla River at or in the vicinity of the interstate line, is the water from the drainage of the north and south fork, the main stream and small tributaries above, with the exception of a few artesian wells which do not enter the problem.

(800) There are no static waters confined under pressure in that water table. The springs are produced by the intersections of the water table and the surface. They are not the overflow of an underground reservoir of static water under pressure. With the exception of a few wells which are entirely through into bedrock, the primary source of which is not correlated to the primary source of the ground water, which we are discussing here, the tapping of the water stream, the underground stream, by wells, would be the tapping of a moving supply of water, however slowly it may move, it would be the tapping of a moving supply of water.

James M. Spencer, for the state of Oregon, testified in part (1147-1156):

(1148) I have made studies to determine the transportation loss in the main channel of the Tum-a-lum from the Red Bridge to the East Side Ditch Company's headgate below the railroad. Two current meter measurements I got 13.6% and 14% loss. In one case there was

15.4 c. f. s. in the stream at Red Bridge, the other there was 13.24 c. f. s.

(1154) I made one of those measurements July 11, 1930; the other July 13, 1932. Water was being diverted between the two points at the time I made the measurements. On July 11, 1930, I metered the stream at the Red Bridge, 13.24 second-feet.

I metered the Cemetery diversion, that is, the pumping plant, one and one-quarter second-feet.

I metered then below—there was a swimming pool in there;—part of my study was to see whether that swimming pool was losing water—I metered below that; I had thirteen second-feet after that other delivery had gone out. At that time there was evidence of some seepage back from Little Walla Walla; probably off-set the pumping plant of the cemetery.

Then I measured the Tum-a-lum delivery—the nursery was not pumping at that time,—and the East Side delivery, and there was a loss of 1.8 second-feet between the point where I measured last and the final delivery to those two channels. There was no other delivery between there.

July 13, 1932, I metered the Tum-a-lum, 15.4 second-feet; the Tum-a-lum ditch, 2.3 second-feet; the East Side, 10 second-feet. The Miller Nursery was pumping 1 second-foot. 13.3 second-feet; loss 2.1. I do not have the amount of the diversion at the Red Bridge through the Little Walla Walla at the time of the measurements; the bulk of the water was in the Little Walla Walla; that was a very small part of the water in the river. I can't say certainly whether the Hudson Bay was diverting any water at the time of the measurements. I think not.

(1149) During the time I have been here I have ascertained what amount it is necessary to turn down in those various natural channels in order to carry to the diverters from those channels the amount of water decreed them. We have done it in a rather cut and try method. We have determined it runs from 17% to 20% to the East Crockett. I think it has gone as high as 22%.

Ed K. Humphrey, for the State of Oregon, testified in part (862-884; 887-893; 1157-1170):

(867) I have made a study of the comparative flow as to the time of the rise and fall of the Walla Walla River and of Mill Creek. There seems to be a direct relation in the fluctuations of those two streams. We have actual measurements of Mill Creek (Washington Exhibit 19) plotted on the graphs (in Oregon Exhibit 41) for the years 1914, 1915 and 1916. The comparison is between Mill Creek and the South Fork only. That is the only record available for the two streams. But they show a very distinct and evident relation between the flow of the two streams over those periods.

(874) In my table on the fifth page from the last (of Oregon Exhibit 42), based on measurements of the Gardena canal in the year 1932 shown in Washington Exhibit 18, I allowed 12.7% loss in the canal from the river to the project for the year 1933. The volumes of water in the canal were substantially the same for the two years.

(880) The total power bill of the users of wells for irrigation from the Pacific Power and Light Company for 1932 was $11,789.32 and from the Milton City power for 1931 was $3,710.47. These are the only two sources of power for the operation of wells by electrical energy.

(888) With the exception of the pages entitled, first, "1932 Use of Water from Wells;" second "Pumping Equipment Efficiency Data," and (third) "Table Showing Per Acre Delivery Amounts Based on the Preceding Figures and the Flow in the Gardena Canal," the datum in Oregon Exhibit 42 relates to the test places listed on page 1 (of the exhibit). The soil classification on page 1 of the exhibit under column entitled "Soil Class," is taken from Youngs' map (Washington Exhibit 15).

(892) I will read into the record a list of the pages of the Oregon decree (Washington Exhibit 1) on which the several rights of these test places are found:

The Charles Eiffert place, page 116.

John Gunn (Knopf) place, page 130.

Hermann place, page 138.

Herr place, page 139.

Karker (Corkery) place, pages 149, 109.

Roeder place, page 216.

The Babcock and Harris places take water from the West Prong and the Bookout ranch takes water under a permit on the Pleasant View Ditch.

(1166) On Oregon Exhibit 44, under the word "Channel," I have a list of names which refer partly to natural channels and partly to ditches. As I understand it, the Stillman, Milton, Powell, Perkins and the Tum-a-lum are all ditches. The measuring point is at the most convenient location on the ditch. The West Crockett, East Crockett, Ford and the East Side Ditch are all natural streams, so far as our decree is concerned, and the measuring points (for them) are the points of diversion of each individual landowner.

WILBUR L. POWERS, for the State of Oregon, testified in part (1002-1036, 1127-1132, 1171):

(1013) The term "usable water capacity" would include the moisture stored in the soil between the point of permanent wilting, or just above it, as the lower limit, and the moisture equivalent approximating the higher field samples moisture contents that you would find by the time the soil was dry enough to mulch or seed,—you have had the water present long enough to be in equilibrium with the soluble material in a solid phase, so it would really be of nutrient value to the plant. The usable water capacity for fine sand is about one inch, about the coarsest sand we irrigate. On the other end it is only the heavier soils that will hold more than two inches and a half usable water.

(1016) Most of the storage capacity in this No. 3 soil of the Milton fan is in the first 2 feet and is on the order of two or two and a half inches. I would say the usable soil would be largely within the first two feet, some value in the third foot. For good growth rate, we should have usable moisture in the major part of the feeding root zone.

(1020) It would be difficult to apply much less than a five inch irrigation upon this No. 3 land, and perhaps two and a half to three inches of it might be retained.

(1021) Assuming the application of 5 acre-inches for each irrigation, it would take a head of one and a half inches to the acre, continuous flow to go over the No. 3 land, for the critical months.

(1025) In the surface soil in the No. 3 area around the Milton-Freewater territory, there has been heavy

manuring and disking in of alfalfa, and the organic content is rather good, and in the sub-soil there isn't so much. The first 6 inches to plow depth our test indicated on the order of 5 to 6 per cent organic matter.

(1028) Tree crops on the No. 3 lands, in my judgment, should be irrigated about once a week. Tomatoes, apparently, must be irrigated at least twice a week to prevent wilting.

(1029) The amount of water I have suggested, one and one-half miner's inches, continuous flow, is rather an unusual amount of water for irrigation and for a very unusual soil. These unusual conditions are the limited, very limited, usable water capacity and no ground water within a distance that will help meet the situation for the roots, and a long, relatively hot growing season, and intensive farming.

(1030) The period of dry years (we have had) has entered into my determination of the amount of water these people should have, only in a general way.

(1030) Early in the season from the dust carried by wind, the water may coat over and penetration along the furrows in the No. 3 soil may be a little slow. The organic matter aids the penetration and also the lateral spread of water applied, I think. The spread would not be good as long as it was open below. There is nothing unusual in that soil between the rocks that would require more water than we would require in soil of that texture anywhere (but) the rocks hold nothing or practically nothing. If they constitute three-quarters or two-thirds of the volume, then your reservoir is very limited.

(1034) I have only spoken here of farm duty, to the farm unit or headgate.

(1128) The colloid fraction of the soil includes the extremely fine particles, both organic and inorganic. Roughly, or in plain words, we say clay jelly and peat jelly or humid jelly. It increases with the fineness of the soil. Normally there is much more in the heavier soils that are higher in clay content.

(1133) I think the soil marked orange on Washington Exhibit 15 just north of the Mill Creek would be even more droughty than the soil marked orange near Milton. It is practically waste land, having gravel pits and dumps, and most of it is unleveled and dry. I think that is extremely coarse in there, a quarter section or so. With that exception, I think the No. 3 lands on the Mill Creek area would have in a rough way the same water requirement as the No. 3 lands on the Walla Walla.

F. A. FULLERTON, for the State of Oregon, testified in part (1037-1041):

(1037) I am business manager of the City of Milton. Our meter records show a consumption of 2 million gallons of water a day in the months of January, February, March and April, and in the summer months of 3 to 3½ million gallons a day. The peak of that use is in the month of August.

(1039) None of our users are metered. These figures I am giving are on our total meter that we have before our water is sold out to the water patrons. It is the main line meter on our system, and measures all the water that goes into our mains.

(1040) This water is used for household use, for lawns only and small garden plots. The regular charge is $1.50 a month and in the summer time we have a

sprinkling charge, a minimum of 35 cents and 70 cents a hundred square yards for the number of square yards the consumer has to sprinkle.

S. T. HARDING, for the State of Oregon, testified in part (1043-1098):

(1046) I arrived here on March 29th and have spent the time from then to the present (April 5th) in field observations, going over the material collected for this case, the exhibits and testimony and other records.

(1055) The rate of seepage loss varies with the character of the material in which the channel is constructed, and with the size of the channel itself. The percentage of loss per mile in the same class of material is materially higher in the smaller channels.

In ~~this a~~rea the flow of the river is divided into different prongs or channels which are natural in origin and which in the upper portion of the cone and the main portion of their lengths are in coarse material.

For the size of those channels which the records that I have examined indicate carry in a general way around twenty second-feet and the distances which they are used to deliver water to the individual rights on this area, I would consider a twenty per cent conveyance loss reasonable. That is, it would be about what one would expect to find with those channel conditions in those soils.

(1056) The natural channels come down the cone in general on the steepest grade, which is approximately one per cent. The first form turn-outs consequently take off at right angles, which is at a rather flat grade, and the furrows then run again on the steeper grade of the land.

Those farm ditches taking out on the flatter side grades apparently catch some of the silt that is in the water, the grass that grows in the ditch assists in that practice, and I noticed a number of the farm ditches recently cleaned in which little gravel was visible, the silt occupying most of the bed of the ditch.

(1062) I would assume that the stipulation of that period and the testimony of the landowners represents a reasonable result of their experience. That period is relatively short. It is shorter than the frequency I have found in other areas in soils except those of very heavy texture or shallow depth over impervious sub-soils. I have found lands on which it is necessary to irrigate as frequently as seven days where the soil is heavy clay, in which only two to two and a half inches of water can be made to absorb at an irrigation and which can't carry the crop for any long period of time.

I have also found that frequency used on shallow soils over impervious sub-soils where similarly limited moisture capacity occurred.

It is also occasionally found necessary to irrigate pasture crops of shallow rooted grass at relatively frequent intervals on soils of somewhat better texture, but for deep rooted crops, such as those mainly grown here, to which the seven-day period applies, that frequency is shorter than that found to be generally required in other areas. The soil itself is coarser than the soils of which I have found longer periods usable, and the seven days appears consistent with the ten to twelve or fourteen that are usual frequencies in areas of other coarse soils.

The seven days I mention applies to the tree crops with cover crop.

The record indicates that for tomatoes and shallow rooted crops even shorter frequencies are needed.

(1064) That soil is relatively coarse, contains a large percentage of gravel and rock fragments of larger size. The soil filling material, or the finer soils within the gravel, as indicated in the soil survey and as I have observed it, reaches from a medium to fairly light texture through which water would move readily, and I found from the information obtainable that they apparently use five to six inches depth of water for irrigation, which is about what I would expect to find necessary to use to get over these lands with the length of furrows and the methods employed.

(1065) These soils are clearly ones of limited moisture holding capacity. If the soils can only carry for a week's time from an irrigation, and five to six inches are applied at each application, obviously the difference must become a deep percolation through the land.

(1066) Evaporation will occur from the surface of the soil in the furrows. That should not be much in this case, due to the general shading of the cover crop. The transpiration of the cover crop to some extent balances the saving in that evaporation. The figure I have used of two to two and a half inches per week consumption of moisture would include evaporation from the surface of the soil as well as transpiration from the trees.

(1067) The necessary frequency of irrigation, my soil test experience in other places, with the transpiration of moisture in July and August, would indicate that 2 to

2½-acre inches of water is retained by the soil after each irrigation. If a five to six inch irrigation weekly is applied and we make some allowance for loss by seepage in farm ditches, the rate of flow required would work out closely to an inch and a half per acre continuous flow, using the Oregon value of the miner's inch.

(1070) In this area they use natural channels to a greater extent for conveyance of water than is customary in most areas, because of the natural condition of division of the water into various channels to distribute over this area.

(1078) The water supply of those more northerly lands (in Oregon) is affected, in my opinion, by the irrigation on the cone. The actual use of the water by the individual landowners is probably not affected. Those lands are Class 1-D and Class 4. Both of these classes are soils of better texture than the Class 3. They would not require as frequent irrigation or as large amounts of use. Both of these classes have water table within 6 feet of the surface. I have not attempted to make a detailed analysis of the reasonable requirements of the individual holdings within this area. It is, in my opinion, clearly less than that of the Class 3 lands, but an actual determination of *the reasonable use would involve* the consideration of the individual holdings, the variations in soil at the margins of the different soil classed, and other similar detailed information, which has not been available.

(1083) I would consider the present decree reasonable in regard to those lands, having in mind that it includes a provision that the rate of use specified is the

maximum rate permitted, and that actual use is limited by the requirements for beneficial application.

(1084) It was not my intention to say that the amount of the allowance in those decrees is tolerable because the decree provides that the amount awarded is the maximum and protects against excessive use by limiting the user to a beneficial use. The point I was making is that in my opinion the allowance of an inch and a half per acre is reasonable for the larger part of the gravel cone, but that within that area, not recognized by the decree but probably existing, one could find small areas where perhaps the land could be handled on a somewhat smaller allowance, but that the scattering of those areas and their extent is such that it is not feasible to distinguish them in the decree. I think the maximum allowance in the decree is itself a measure of the requirement of the lands for the main portion of those areas. The decree unless it goes into the definition of variable rights of use for each individual area, if it applies any uniform rate to a larger area should have that rate large enough or liberal enough to cover the requirements of the main portions of the coarser types.

(1090) It would not be my recommendation that a water requirement of one and one-half miner's inches be distributed to all the lands having rights under that decree. I said that if you are going to have a single value of water requirement under the decree that value must be large enough to include any substantial area within the total area. If you have only one limit it has to be the top limit, otherwise certain lands would not be able to get the water which they require.

I did testify that while the limit, except for the two large ditches, in this decree is stated as an inch and a half per acre, there are lands at the north end which do not require an inch and a half per acre and which it is my understanding are not supplied an inch and a half per acre at low water periods from the flow of the upper stream; they are limited to such water as is available from the springs.

(1087) The silt content of the flow that comes through the branches below the Frog would be higher at flood stages. I haven't examined the stream at flood stages and do not know to what extent it may carry silt. The water now flowing is reasonably clear. Most of the natural channels have a steep grade and the gravel is exposed in their bed. I did note occasional places where a stream channel has taken a turn where velocity is checked where a silt berm has formed in the bend. I have stated that where the diversion channel took out at right angles to the stream I found the diversion well silted. That came from the main stream, but in the main stream, which is in most of its length of steeper grade, the silt would tend to be carried through, except where the water is checked.

GEORGE N. CARTER, for the State of Oregon, testified in part (1099-1125):

(1107) I came here March 25th, and ever since then have been quite industriously engaged in the study either of field conditions or of the various records which are available for consideration of this project.

Irrigation practice in general in the Walla Walla valley seems to be quite in conformity to the methods

and systems used in other places with which I am more familiar. The method of distribution of water is quite common, and I think well-accepted practice. And in general I would say that conditions, with the exception of soils, are fairly similar to other areas with which I am acquainted.

(1109) It appears that the minimum amount of water which can be applied to these lands in one irrigation is five or six inches in depth. That also checks my experience elsewhere. I have observed that generally speaking five or six inches is about a minimum application under average farm conditions, that application being a minimum of five or six inches, then the frequency will determine the amount of water necessary during any period of time, a month, or the irrigation season.

(1111) Taking the nine test places, the average use of water during the month of July was 2.52 acre-feet per acre.

During the month of August it was 2.09 acre-feet per acre.

Making a mean for the months of July and August of 2.3 acre-feet per acre, which, converted to continuous flow, amounts to 1.49 miner's inches per acre.

I said that I took the nine places. I eliminated the Bookout place, on account of the fact that its soil is not representative or similar to the other places, which were largely gravel lands or lands approaching the gravel. It would have been impossible to have gotten a July record. As I recall, that right shut off on about the 4th day of July.

(1117) The use record, in my opinion, is of con-

siderably more value than any other information at hand. It has been my experience with irrigation farmers, where they are working under conditions of limited water supply and are attempting and succeeding in applying reasonable methods, that their conclusion or ideas as to the amount of water available during a season are the most reliable guide. I think there is probably a tendency on one side to approach a theoretical minimum, which may be opposed on the other side by poor or haphazard irrigation farming or just use of water. The problem as I see it is to reach a reasonable meeting ground between these two extremes. At least that is the theory that I have pursued in my irrigation work.

(1117) In fixing the duty of water for No. 3 soils, including the 2-B, at an inch and a half per acre, I feel that is a reasonable meeting point between those two extremes for this district. I do not have in mind any case of extreme use in this district beyond one and a half miner's inches. I was just stating the problem generally, that that is the problem. There may be cases in this valley where more water is used, but I don't know of them. That is frequently the case in any irrigation project, that there will be a few farmers who either will attempt to use more water or else they will succeed less with the same amount of water as their neighbor.

(1123) I find no saving appliances up in that territory more than well-constructed channels, which confine the water as much as possible—good, concrete control gates, turn-outs, where rather rapid adjustments can be made of the supplies, the water is not spread out all over

the country and running wild, anything like that. It is pretty well controlled, I think.

(1124) My understanding is that a number of those rights with fairly good priorities on the river still pump to augment their supply. Many of them also have later rights which cannot be used in the summer time from the stream.

### Conclusion of the Testimony

Both parties having rested, the following took place (1193-1195):

The Special Master: Let the record show that both sides in this case have rested.

What time do counsel desire for the preparation and filing of the briefs?

The order will be that the State of Washington shall have 60 days from this date (April 6, 1934) within which to prepare, serve and file its brief. The State of Oregon may have from the date of such service of the Washington brief upon it, a period of 60 days within which to prepare, serve and file its brief. The State of Washington may have an additional 15 days within which to file a reply brief if it is so advised.

Upon the application of either party and upon good cause shown, oral argument may be had after the briefs are filed at such time and place as may be fixed by the Master.

The case will now be submitted, as far as testimony is concerned, and the Court will stand adjourned.

# EXHIBITS

**List of All Exhibits Received in Evidence**

**(Numerals in parenthesis refer to page of reporter's transcript of testimony where submission of exhibit in evidence is shown)**

| | | |
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| Washington Exhibit 1. | (9) | Oregon Decree on Mandate involving Walla Walla River. |
| Washington Exhibit 2. | (10) | Oregon Decree and Findings involving Pine Creek. |
| Washington Exhibit 3. | (10) | Oregon Decree. Findings and Supplemental Findings involving Middle Branch of Mud Creek. |
| Washington Exhibit 4. | (10) | Oregon Decree and Findings involving East Branch of Mud Creek. |
| Washington Exhibit 5. | (10) | Oregon Decree and Findings involving Dugger Creek. |
| Washington Exhibit 6. | (10) | Oregon Decree and Findings involving Goodmans' Spring Branch. |
| Washington Exhibit 7. | (10) | Oregon Decree and Findings involving Johnson Creek. |
| Washington Exhibit 8. | (10) | Oregon Decree and Findings involving South Branch of Mud Creek. |
| Washington Exhibit 9. | (11) | Oregon Decree and Findings involving West Prong of Little Walla Walla River. |
| Washington Exhibit 10. | (12) | Tabulation of Oregon Permits. |
| Washington Exhibit 11. | (12) | Washington Decree and Referee's Report involving Walla Walla River. |
| Washington Exhibit 12. | (12) | Washington Decree, Decree on Remittitur, Referee's Report and Supplemental Report involving Doan Creek. |
| Washington Exhibit 13. | (12) | Washington Decree, Order Modifying Decree, Referee's Report and Supplemental Report involving Stone Creek. |
| Washington Exhibit 14. | (12) | Tabulation of Washington Permits. |
| Washington Exhibit 15. | (12, 896) | F. O. Youngs' Soil Map. |

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| Washington Exhibit 16. | (14) | Ground Water Report by Arthur M. Piper in 2 Volumes, including 2 Plates. |
| Washington Exhibit 17. | (15) | General Official Map of Walla Walla Basin. |
| Washington Exhibit 18. | (16, 254) | Hydrographic Data of Walla Walla River System—bound volume. |
| Washington Exhibit 19. | (16, 454) | Supplemental Hydrographic Data—Walla Walla River. |
| Washington Exhibit 20. | (18) | Tabulation (by sections) of estimated irrigated acreages of related lands in *Washington* under soil classifications shown on Youngs' soil map. |
| Washington Exhibit 21. | (19) | Tabulation (by sections) Same—as to lands in *Oregon*. |
| Washington Exhibit 22. | (19) | Tabulation (by priorities) of estimated irrigated acreages of related lands in *Washington* under soil classifications shown on Youngs' soil map. |
| Washington Exhibit 23. | (19, 159) | Tabulation (by priorities) Same—as to lands in *Oregon*. |
| Washington Exhibit 24. | (56) | Telegram—Bartholet to Luper (10 words). |
| Washington Exhibit 25. | (56) | Telegram—Bartholet to Luper. |
| Washington Exhibit 26. | (56) | Telegram—Luper to Bartholet. |
| Washington Exhibit 27. | (126) | Tabulation of Administration of Stream System in Washington by Harlow Barney, Water Master. |
| Washington Exhibit 28. | (309) | Abstract of Oregon Well Permits. |
| Washington Exhibit 29. | (309, 311) | Tabulation—Wells in related area in Oregon. |
| Washington Exhibit 30. | (453) | Tables Nos. I, II, IIa, III, IV, IVa, V, VI, VIa, VIb, and VII showing engineering studies of the Walla Walla River by James G. Woodburn. |
| Oregon Exhibit 31. | (455) | Finis Decree. |
| Oregon Exhibit 32. | (457) | Names of Oregon Water Masters with official record of their respective appointments. |
| Oregon Exhibit 33. | (474, 459) | Tracing of survey lines of canals—involving right of Gardena Farms District. |

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| Oregon Exhibit 34. | (477) | Blue print of tracing of old survey of line of main canal—involving right of Gardena Farms District. |
| Oregon Exhibit 35. | (479) | Blue Print of Orgeon Exhibit 33 as it is alleged to have been before altered. |
| Washington Exhibit 36. | (629) | United States Land Office Record involving W½ of Section 11-6-33. |
| Oregon Exhibit 37. | (704) | Map of recent survey of old survey of line of canal and designation of area above elevation of old survey, involving right of Gardena Farms District. |
| Oregon Exhibit 38. | (792, 807) | Model — Relief Map — by Arthur M. Piper. |
| Oregon Exhibit 39. | (853) | Tabulation of acreage above elevation of old survey of line of canal shown in Exhibit 37, involving right of Gardena Farms District. |
| Oregon Exhibit 40. | (864) | Map of plane table survey of irrigated acreage of Gardena Farms District. |
| Oregon Exhibit 41. | (865, 888) | Hydrographs of data in Exhibits 18 and 19. |
| Oregon Exhibit 42. | (868, 893) | Hydrographic data and measurements submitted with the testimony of Ed. K. Humphrey. |
| Oregon Exhibit 43. | (1015) | Graph of Dr. Powers—Water holding capacity of soils. |
| Oregon Exhibit 44. | (1157, 1162) | Analysis of alleged over-diversions in Oregon—1933. |
| Oregon Exhibit 45. | (1172) | Bridges in Oregon and Washington, their names and respective locations. |
| Washington Exhibit 46. | (1178) | Mechanical analysis — Mill Creek gravelly loam—fine earth. |
| Washington Exhibit 47. | (1189) | Tabulation—Dr. Woodburn—Flow at various points of Walla Walla River in c. f. s.—June, Oct., Nov., Dec., 1933. |

## OBJECTIONS TO EXHIBITS

The exhibits above listed were received in evidence. All were submitted without objection with the following exceptions, which are referred to by number with a statement of the record as to the objection applicable thereto set forth following each respectively (numerals in parentheses refer to page of reporter's transcript).

## WASHINGTON EXHIBIT 15

In connection with the soil map prepared by F. O. Youngs which was introduced in evidence as Washington Exhibit 15, it was agreed by counsel in open court (12) that Mr. Youngs prepared this map after an examination of the territory in question being personally upon the ground, that this was prepared by cooperative arrangement between the State of Oregon and the State of Washington, and that Mr. Youngs' qualifications are as follows:

(896) F. O. Youngs received the degree of B. S. in agriculture from the State University of Idaho in 1921; spent the summers of 1920 and 1921 on soil survey work for the State University of Idaho. He has had three years practical farm experience. From the year 1922 to date he has been with the Bureau of Chemistry and Soils, United States Department of Agriculture, and at all times from the period of the soil surveys of the lands classified set out in the simplified soil map, Washington Exhibit 15, Mr. Youngs was and now is Assistant Soil Surveyor with said Bureau in the United States Department of Agriculture.

## WASHINGTON EXHIBITS 20-23

(17-20) These exhibits contain estimates of the acreages of the various areas classified on F. O. Youngs' soil map (Washington Exhibit 15) according to type of soil; Exhibit 20 being a tabulation by sections of the estimated acreages of the related lands in the State of Washington; Exhibit 21 being a tabulation containing the same information for lands in the State of Oregon; Exhibit 22 being a tabulation by priorities of the rights on estimated acreages of the related lands in the State of Washington; and Exhibit 23 being a tabulation containing the same information for lands in the State of Oregon.

Upon submission of these exhibits in evidence, the following took place (19):

(19) MR. COCHRAN: We object to them as being a mere estimate, and it does not show what would be the governing classification of any particular man's water right, and it is impossible from maps and decrees to so make that acreage so as to delineate just what would be any particular year or any particular priority.

THE SPECIAL MASTER: You admit the qualifications of Mr. Chase?

MR. COCHRAN: Yes, we admit the qualifications of Mr. Chase.

THE SPECIAL MASTER: You admit the competency of the datum from which he took these surveys? For instance, Mr. Cunningham states that he perimetered around upon a map. The court does not know what map. Counsel may know what map—

MR. CUNNINGHAM: For the record I might state Mr. Young's soil map.

THE SPECIAL MASTER: Without an examination the court can not fix a value upon thi. testimony, and will say that counsel may protect themselves upon these exhibits pretty fully by cross-examination if they want to. They will be admitted subject to motion to strike after counsel for the State of Oregon have examined them, and will be able to point out to the court whether or not they do contain valuable information in the adjudication of this matter, but if there is no motion to strike the exhibits will remain in the record for what they are worth.

(159) MR. COCHRAN: We do not deny the section or the type of soil, but simply the present exhibit, and by reason of the fact it is impossible to arrive at a correct acreage distribution according to priorities, we move to strike out the Exhibit 23, I think it is, which is the tabulation by priorities.

THE SPECIAL MASTER: The motion will be noted and ruled upon after examination.

## WASHINGTON EXHIBIT 29

(310) MR. CUNNINGHAM: We are offering in evidence at this time Washington's Exhibit No. 29, being a tabulation of approximately 80 per cent of the wells in the related territory in Oregon. The datum in this tabulation has been secured through inquiry that is based upon hearsay. Copies of this tabulation have been in the hands of opposing counsel.

THE SPECIAL MASTER: Any objection to the competency or the relevancy of this testimony?

MR. COCHRAN: We object to the materiality and the relevancy of it on the ground that the wells in question apply to the use of percolating waters which belong to the landowner and over waters concerning which this court would have no jurisdiction and the use of which is in no way connected with the use of the surface waters and the stream flow of the stream.

(311) THE SPECIAL MASTER: The objection will be noted.

## OREGON EXHIBIT 31

(455) MR. COCHRAN: I would like at this time to introduce in evidence the findings of fact, conclusions of law and decree in the Circuit Court, and decree upon the mandate from the Supreme Court of the State of Oregon as entered in the records of the Circuit Court of the State of Oregon for Umatilla County in the case of Little Walla Walla River Irrigation Union and others versus Finis Irrigation Company and others, final decree made and entered in the Supreme Court of the State of Oregon on October 5, 1912.

MR. CUNNINGHAM: I would like to have the record show the State of Washington objects to the introduction of this decree in evidence as being immaterial and not relevant to any issue in this case. Our understanding is that the rights involved in this decree were all adjudicated in the decree and contained in the decree of the Circuit Court of May 16th, being Washington's Exhibit No. 1, and that the Exhibit No. 1 supersedes any rights adjudicated in this decree.

THE SPECIAL MASTER: Do you object, Mr. Cunning-

ham, to the competency,—that is, that this is not an exemplified copy?

MR. CUNNINGHAM: There is no objection to the form of the decree.

THE SPECIAL MASTER: You just object to the materiality?

MR. CUNNINGHAM: The materiality.

MR. COCHRAN: It is our contention that while the Exhibit 1 is based upon this decree and includes a great deal more land than this decree includes, yet it is our position that with the beginning of that decree we began the distribution of water in 1912 and it is to show the taking charge of the distribution of water and separate distribution from that time on as a separate stream system in Oregon, and also is one of the items in adverse possession.

THE SPECIAL MASTER: The objection will be noted, and the exhibit may be received.

## OREGON EXHIBITS 33, 34, 35, 37, 39 AND 40

These exhibits relate to the right of the Gardena Farms District.

(459) MR. PAUL: I would like to state an objection at this time. The Washington decree, being Washington Exhibit No. 11, the general official map, being Washington Exhibit No. 17, the stipulations on file, and the testimony so far taken show that the Gardena appropriation from the Walla Walla River in Washington is Claim No. 570 of the Washington decree, by which decree the State of Washington recognized and established the appropriation of the Walla Walla Irrigation Company as a vested

and accrued right in said company to a priority dated 1892 and issued a certificate of water right to said company further evidencing the same; that the Gardena Farms District No. 13 has succeeded to all the rights of the Walla Walla Irrigation Company recognized and established by said decree and said certificate of water rights; that the Walla Walla River is an innavigable interstate stream flowing within the boundaries of the two states involved in this action, and under the facts and the laws of Congress the State of Oregon cannot in this controversy in this Court question the validity of the Gardena appropriation or its priority date, and the State of Washington objects to the introduction of any evidence to that end as not being material or relevant to the issues involved herein.

THE SPECIAL MASTER: Of course, the Court would have some trouble—I think the objection is properly in the record at this time, but I cannot pass upon the testimony until I hear what it is about—it is anticipatory—but the testimony of this witness as addressed to the subject indicated by Mr. Paul will be received subject to the objection and he need not repeat the objection as the testimony is offered.

(477) MR. RANDALL: We desire to offer in evidence the Exhibit (33).

MR. CUNNINGHAM: We object to the introduction of that exhibit in evidence for the reasons heretofore stated.

THE SPECIAL MASTER: It may be admitted subject to the objection. Counsel will not hereafter need to repeat their objections, however, to this class of testimony.

The remaining exhibits above numbered were introduced subject to the same objection by the State of Washington. (477, 479, 704, 853, 864).

## OREGON EXHIBIT 42

(893) MR. CUNNINGHAM: We have no objections to the introduction of this exhibit, (except) the Gardena tabulation.

THE SPECIAL MASTER: The tabulation in Exhibit 42 referring to the Gardena project may be subject to the objection read into the record by Mr. Paul, counsel for the State of Washington.

## OREGON EXHIBIT 44

(1162) MR. CUNNINGHAM: Just a moment. We would like to enter an objection to the introduction of this Oregon Exhibit 44, particularly for the reason that in the note reference is made to the right awarded by the Finis decree. As we understand the purport of that decree, it does not award any right to any water in the main streams, but merely awards, you might say, a permissive use of any water that might be tail water from the over-diversion from the Milton ditch.

THE SPECIAL MASTER: Is the decree in evidence?

MR. CUNNINGHAM: It is in evidence, yes.

THE SPECIAL MASTER: The Court will pass upon the decree.

MR. RANDALL: There is no contention, if the Court please, contrary to Mr. Cunningham's statement—

THE SPECIAL MASTER: The objection will be noted as prior to the admission of the exhibit, and the exhibit will be admitted subject to the objection.

The foregoing is respectfully submitted.

G. W. HAMILTON,
*Attorney General of the State of Washington,*

GEO. G. HANNAN,
*Assistant Attorney General of the State of Washington,*

FRED J. CUNNINGHAM,

T. A. PAUL,
*Special Counsel for the State of Washington,*

*Attorneys for Complainant, State of Washington.*

CLERK'S COPY.

# Supreme Court of the United States

**OCTOBER TERM, 1935**

IN EQUITY.

# No. 11, Original

THE STATE OF WASHINGTON, COMPLAINANT,

*vs.*

THE STATE OF OREGON.

ABSTRACT OF RECORD PREPARED BY THE STATE OF OREGON.

**FILED OCTOBER 14, 1935.**

Office Supreme Court, U.
OCT 14 1935
CHARLES ELMORE CROPLEY
CLERK

# ABSTRACT OF RECORD

No. 11 ORIGINAL

IN THE

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1930

THE STATE OF WASHINGTON, COMPLAINANT

VS.

THE STATE OF OREGON, DEFENDANT

TESTIMONY TAKEN BEFORE

HON. WILLIAM W. RAY

*Special Master*

# ABSTRACT OF RECORD

No. 17 ORIGINAL

IN THE

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1930

THE STATE OF WASHINGTON, COMPLAINANT

VS.

THE STATE OF OREGON, DEFENDANT

TESTIMONY TAKEN BEFORE

HON. WILLIAM W. RAY

*Special Master*

## INTRODUCTION

Believing it necessary to a proper presentation of the case on the part of the State of Oregon, we have printed excerpts from Stipulations No. 3 and No. 5, and a more complete narration of the testimony of witnesses on the part of the State of Oregon. We have omitted the list of exhibits and objections, as shown at pages 251 et sequitur of the narration of testimony by the State of Washington. We have also omitted the narration of any testimony given by the witnesses for the State of Washington. We have also omitted the testimony of H. V. Whiting as unimportant.

## STIPULATION No. 3

(Omitting title and Paragraph I)

### II. IRRIGATION PRACTICES

The growing season in the Walla Walla Basin extends from April to October, inclusive. Irrigation during this growing season is called herein summer irrigation, and irrigation during any other part of the year is herein called winter irrigation. Winter irrigation is practiced on the lands served by the Milton, Freewater & Hudson Bay Irrigation Company, and on some of the lands of the Gardena project. The balance of the Walla Walla Basin is served by summer irrigation. In all cases where the water supply is not sufficient to supply water during the entire growing season, the practice is to store water in the soil, where possible, by irrigation prior to the growing season and whenever water is available. In summer irrigation of orchards, alfalfa and grain, outside of the gravelly soil, the practice is to apply water about once every two weeks. In areas of gravelly land, the practice is to apply water to such crops once a week. In the gravelly soil in and around Milton and Freewater, for strawberries, tomatoes, garden vegetables and short-rooted crops, the practice is to apply water two or

three times a week. Where the application is made several times a week, the period of application is from two to four hours each time. Where it is once a week, the time of application is from eight to twelve hours. Where application is made at longer intervals, the length of time depends upon the amount of acreage, and in most cases a continuous flow to each irrigator is used. The flooding method of irrigation is not practiced. Nearly all the irrigation is by what is known as the corrugation method.

It is the general practice in the orchards to grow cover crops of clover, alfalfa and the like, as a protection against evaporation. These crops are usually chopped into the soil as fertilizer.

Controlling works are found at the principal points of diversion from the stream. Weirs for measuring individual rights are in general use throughout the valley.

Rotation is practiced to a considerable extent. In Oregon, in the deep soils, the rotation period is from one to two weeks for alfalfa and grain. In the gravel soils, for orchards and alfalfa, the average irrigated acreage for a group of rotaters is about 60 acres, and rotation is practiced on a weekly basis. Where the gravel soil about Milton and Freewater is cultivated to strawberries, tomatoes, vegetables and short rooted crops, the average irrigated acreage for a group of rotaters for such crops is from 10 to 20 acres and rotation is practiced on both a twice a week and a thrice a week basis. Rotation under the Oregon decrees may be enforced by the water master, and in some instances is carried out by agreement of the parties. In Washington, rotation is practiced under all ditches operated by irrigation districts, and in the vicinity of Walla Walla, by private arrangement between the individual water users. The period of rotation varies greatly, but averages, it is estimated, about ten days.

In some instances there is a run-off from the irrigated lands, caused by the use of a large head of water. This run-off, locally called waste water, is utilized on succeeding tracts.

In the section around Milton and Freewater, there are approximately 300 wells which pump water from the lower gravel strata and apply it to irrigation. In Washington there is little irrigation from wells.

## III. CROP PRODUCTION

*Oregon.* In Oregon the crops consist of wheat, alfalfa, hay, prunes, apples, cherries, tomatoes, berries, vegetables and nursery stock. In the irrigated section there are from 3000 to 4000 acres of prunes, yielding about 6 tons to the acre; from 1000 to 1800 acres of apples, yielding about 8 tons to the acre; 200 to 300 acres of cherries, yielding about 4 tons to the acre; about 200 acres of tomatoes, yielding 10 tons to the acre. (The acreage of tomatoes has been cut down this year from past years, in accordance with the general policy of cutting the amount of production. Last year the acreage was about 300 acres.) There are about 125 acres of berries, yielding about a ton to the acre. Nursery stock of about 175 acres supplies about 40 carloads per year, besides the local market. Alfalfa hay is raised on from 2000 to 2500 acres of land, and yields from 5 to 7 tons per acre, depending on the length of time that water is available for irrigation. In this district there are approximately 2500 dairy cattle, exclusive of those kept for family purposes only. In the line of vegetables, squash, melons, potatoes and other varieties yield in proportion to the tomatoes. There has also developed a considerable flower trade. A number of growers specialize in peonies, supplying the trade not only with peony blooms but with the plants.

*Washington.* The crops of the valley in Washington consist principally of alfalfa, wheat, vegetables and fruits. It is estimated that 40,000 tons of alfalfa are raised in this area annually. The average acreage yield is 6 tons. Wheat on irrigated land is generally raised as part of the rotation between alfalfa plantings. It is estimated that 1000 acres of wheat are irrigated in this area annually. The average

acreage yield is 50 bushels. Crops of vegetables are grown quite extensively. The average annual yield of the following varieties is: Head lettuce, 49 cars; cabbage, 16 cars; rhubarb, 35 cars; onions, 300 cars; spinach, 100 cars; tomatoes, 30 cars, cantaloupes, 46 cars; potatoes, 307 cars; mixed vegetables, 84 cars. The average acre yield of the following varieties is: Asparagus, 500 boxes to the acre; spinach, 500 boxes per acre; onions, 600 sacks per acre; potatoes, 200 sacks per acre. Fruits are also grown in this area. In 1932, 125 cars of apples and 302 cars of prunes were estimated to have been shipped out of Walla Walla. Apples in this territory yield from 5 to 10 boxes per tree. Prunes yield as high as 600 boxes to the acre. The sweet varieties of cherries are grown, yielding as high as 100 pounds to the tree. It is estimated that 145 tons of cherries were raised in 1929. Peaches and pears are grown successfully principally for the local market. 16 tons of peaches were raised in 1929. An average of 10 cars of grapes are shipped from Walla Walla annually. Strawberries yield as high as 600 crates to the acre. Approximately 100 acres in this area are devoted to berry culture. It is estimated that there are 4000 milk cows on the farms in this area. Two and three-quarter million gallons of milk were produced in 1929. Poultry is also raised extensively. 7500 turkeys, 1600 ducks and 1000 geese were estimated to have been raised in this area in 1929. $47,000.00 was also realized from the sale of chickens in that year.

## IV. DEVELOPMENT OF COMMUNITY

*Oregon.* The Oregon community supports a flour mill, a sawmill and box factory, cider works, a dehydrating plant and a vinegar plant, in addition to a number of commission houses and fruit and vegetable distributors. In order to handle the fruit and vegetable crops, five cold storage houses have been erected and are operated by the various companies.

The district contains ten grade schools, having a total of about 1000 pupils, and a splendid Union High School. There are about ten churches. This property, together with the municipal buildings of the two towns, represents a value of about half a million dollars.

*Washington.* In the city of Walla Walla there are 66 manufacturing plants, including four flour and feed mills, a meat packing house, a cannery, specializing in vegetable canning, three creameries, an iron products foundry, two sash and door factories, a concrete pipe and conduit plant, and other small manufacturing enterprises. The annual value of the products of these industries is $6,279,166.00.

The city of Walla Walla supports a high school, six grade schools, three parochial schools, three music schools and two colleges, with an aggregate average annual attendance of 5300 students. There are twenty-four churches, representing all principal denominations, four theatres and three hospitals. Grade schools and churches exist and are well distributed outside the city in this area.

## V. POPULATION, FARM ACREAGE AND ASSESSED VALUATION

The territory herein considered excludes all that part of the river basin which by stipulation has been heretofore removed from any issue in the case.

*Oregon.* The related territory in Oregon, excluding the Hudson Bay lands, has a population, according to the 1930 census, of 4772, of which 2308 is urban, being the cities of Milton and Freewater, and 2464 is rural. In addition, the Hudson Bay lands are occupied by about 65 families, which would raise the total population of the district to about 5000.

The irrigated lands are farmed intensively. The 6233.87 acres irrigated from the Walla Walla River, spring branches and East Prong of the Walla Walla, are divided into 889 farms, with an average acreage of 7.01 acres. The West

Prong and Lewis Spring Branch have 618.74 acres, divided into 36 farms with an average acreage of 17.19. The Pleasantview Ditch Company irrigates 1249.18 acres, divided into 62 farms with an average acreage of 20.15. The Milton, Freewater & Hudson Bay Irrigation Company irrigates 2675.41 acres, divided into 57 farms, with an average acreage of 47 acres. This makes a total acreage in the related area of 10,777.20, divided into 1044 farms, or an average acreage of 10.32 acres.

This acreage has an assessed valuation, on the 1932 roll, exclusive of the Hudson Bay acreage, of $1,543,120.00. The Beauchamp land, of 86.67 acres, irrigated under the Hudson Bay, is assessed at $11,810.00, and the Markham land, 200 acres, is assessed at $21,560.00. Based upon these assessments, it is estimated that the assesed value of the Hudon Bay lands is substantially $250,000.00. The assessed valuation of the cities of Milton and Freewater is $915,975.00. This makes a total assessed valuation of the related district of $2,709,095.00. The assessed valuation is usually counted as averaging about fifty per cent of the actual value.

*Washington.* The related territory in Washington, outside the incorporated towns, has a population of 7090, according to the 1930 U. S. census. The population of the city of Walla Walla, according to the same authority, is 15,976. There are 9615 acres of irrigated land in the vicinity of Walla Walla. The size of the farming units in this area varies from 1 to 500 acres. The average is 17 acres. In the vicinity of Lowden there are 3231 acres, ranging in size of unit from 2 to 160 acres, with an average of 38 acres. In the Gardena district, the smallest unit is 4 acres, the largest 200 acres, and the average 70 acres.

The above described acreage in the vicinity of Walla Walla has an aggregate assessed valuation, on the 1932 tax roll, of general taxes, of $3,845,942.00. The assessed valuation of lands in the city of Walla Walla for the same year is $8,137,409.00. In the vicinity of Lowden, lands were as-

sessed for the same year at $225,670.00, and in the Gardena District, at $234,663.00. The total aggregate assessed valuation of the land in the related area is $12,443,684.00. Under the law in the State of Washington, lands are assessed for taxation purposes at fifty per cent of their actual value.

## PRIORITIES AND APPROXIMATE ACREAGES, AS SHOWN BY DECREES AND PERMITS

The following tabulation shows the approximate acreage under each year's date of priority, as shown by the several decrees of the two states, for the related area, excluding all that part of the river basin which by stipulation has been heretofore removed from any issue in the case, and including the Gardena appropriation, the priority of which is contested by Oregon and reserved for further hearing:

| | OREGON | | | WASHINGTON | | |
|---|---|---|---|---|---|---|
| Year | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1859 | ..... | ..... | ..... | ..... | 37.15 | ..... |
| 1861 | ..... | ..... | ..... | ..... | 314.00 | ..... |
| 1862 | 35.84 | ..... | ..... | ..... | ..... | ..... |
| 1863 | ..... | ..... | ..... | ..... | 83.50 | ..... |
| 1864 | 38.22 | ..... | ..... | ..... | 81.61 | ..... |
| 1865 | 37.12 | ..... | ..... | ..... | 124.23 | ..... |
| 1866 | 3.30 | ..... | ..... | ..... | 137.13 | ..... |
| 1867 | 8.24 | ..... | ..... | ..... | ..... | ..... |
| 1868 | 60.28 | ..... | ..... | ..... | 89.90 | ..... |
| 1869 | 4.18 | ..... | ..... | ..... | 44.45 | ..... |
| 1870 | 47.31 | ..... | ..... | 160.00 | 85.83 | ..... |
| 1871 | 11.06 | ..... | ..... | ..... | ..... | 35.00 |
| 1872 | 55.78 | ..... | ..... | ..... | 79.75 | ..... |
| 1873 | 65.50 | ..... | ..... | ..... | 13.00 | ..... |
| 1874 | 25.26 | ..... | ..... | ..... | ..... | ..... |
| 1875 | 291.47 | ..... | ..... | ..... | 20.40 | ..... |
| 1876 | 72.90 | 15.00 | ..... | ..... | 1.32 | ..... |
| 1877 | 87.73 | ..... | ..... | ..... | 12.00 | ..... |
| 1878 | 81.74 | ..... | ..... | ..... | 54.77 | ..... |
| 1879 | 31.55 | ..... | ..... | ..... | ..... | ..... |
| 1880 | 180.17 | ..... | 43.80 | ..... | 25.20 | ..... |
| 1881 | 123.46 | ..... | 7.50 | ..... | 51.50 | ..... |
| 1882 | 86.90 | ..... | ..... | ..... | 91.00 | ..... |
| 1883 | 55.09 | ..... | 13.00 | ..... | 61.73 | ..... |
| 1884 | 16.50 | ..... | ..... | 125.00 | 149.48 | ..... |
| 1885 | 135.35 | ..... | 14.00 | ..... | 94.58 | ..... |
| 1886 | 54.51 | ..... | 32.00 | ..... | 141.35 | 20.00 |
| 1887 | 217.76 | ..... | ..... | ..... | 30.50 | ..... |
| 1888 | 93.38 | ..... | ..... | ..... | ..... | ..... |
| 1889 | 65.86 | ..... | ..... | ..... | 98.91 | 462.90 |

| Year | OREGON | | | WASHINGTON | | |
|---|---|---|---|---|---|---|
| | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1890 | 113.72 | 10.00 | 60.29 | ..... | 48.50 | ..... |
| 1891 | 131.49 | ..... | ..... | ..... | 178.67 | 29.00 |
| 1892 | 264.05 | 10.00 | 15.00 | 8,221.11 | 647.63 | ..... |
| 1893 | 157.54 | ..... | 9.75 | 431.96 | 18.00 | ..... |
| 1894 | 102.12 | ..... | 82.00 | ..... | 477.97 | 187.70 |
| 1895 | 242.07 | ..... | 75.50 | ..... | 246.75 | ..... |
| 1896 | 30.72 | ..... | ..... | 180.79 | ..... | 65.00 |
| 1897 | 128.31 | ..... | 10.50 | ..... | 141.25 | ..... |
| 1898 | 44.37 | ..... | 9.50 | ..... | 160.00 | ..... |
| 1899 | 7.06 | ..... | ..... | ..... | 6.50 | ..... |
| 1900 | 198.99 | ..... | 50.00 | ..... | 99.33 | ..... |
| 1901 | 87.69 | 49.90 | 11.00 | ..... | 105.45 | 1.00 |
| 1902 | 165.90 | 33.90 | 72.00 | ..... | 38.00 | 52.00 |
| 1903 | 2,725.04 | 15.30 | 7.50 | 40.00 | 147.06 | ..... |
| 1904 | 23.02 | 8.70 | 14.50 | 330.00 | 884.58 | ..... |
| 1905 | 136.35 | 12.80 | ..... | ..... | 25.05 | 10.00 |
| 1906 | 40.06 | ..... | 16.00 | ..... | 123.75 | ..... |
| 1907 | 80.99 | 8.75 | 7.00 | 50.00 | 153.15 | ..... |
| 1908 | 193.82 | 38.84 | 16.70 | ..... | 202.55 | 106.00 |
| 1909 | 316.71 | ..... | ..... | ..... | 42.00 | ..... |
| 1910 | 33.25 | ..... | ..... | ..... | 32.28 | ..... |
| 1911 | ..... | ..... | ..... | ..... | 50.00 | ..... |
| 1912 | 962.14 | ..... | ..... | 15.00 | 371.00 | ..... |
| 1913 | 392.25 | ..... | ..... | ..... | 83.19 | ..... |
| 1914 | 14.00 | ..... | ..... | ..... | 136.50 | ..... |
| 1915 | 97.00 | ..... | ..... | ..... | 63.10 | ..... |
| 1916 | 28.80 | ..... | ..... | ..... | .40 | 33.00 |
| 1917 | 59.00 | ..... | ..... | ..... | 63.28 | 21.00 |
| 1918 | 28.00 | 8.00 | ..... | ..... | 49.90 | ..... |
| 1919 | 59.00 | ..... | 9.25 | 5.00 | 29.00 | 35.00 |
| 1920 | 27.50 | 15.00 | 32.00 | 50.00 | 61.74 | 32.00 |
| 1921 | 12.00 | ..... | ..... | ..... | 75.52 | ..... |
| 1922 | 140.00 | 113.00 | ..... | ..... | 3.60 | ..... |
| 1923 | 140.00 | 37.00 | ..... | ..... | 11.00 | ..... |
| 1924 | 91.00 | 5.00 | ..... | 35.00 | 6.00 | ..... |
| 1925 | 41.00 | 25.00 | ..... | ..... | .50 | ..... |
| 1926 | 3.50 | ..... | 10.00 | 880.00 | 1,419.80 | 49.00 |
| 1927 | 90.40 | ..... | ..... | 15.00 | ..... | ..... |
| 1928 | 281.15 | ..... | ..... | ..... | 25.00 | ..... |
| 1929 | 30.00 | ..... | ..... | ..... | 7.50 | ..... |
| 1930 | 44.30 | ..... | ..... | ..... | ..... | ..... |
| 1931 | 1.00 | ..... | ..... | ..... | ..... | ..... |

## STIPULATION NO. 5

The following are excerpts from the above stipulation, relating to Gardena: (Exhibits A, B, C, D, and E attached to the stipulation are not printed).

The following facts are hereby stipulated and agreed.

The largest diversion from the Walla Walla River in the State of Washington is for lands served by the Gardena

Farms District Canal, formerly Walla Walla Irrigation Company Canal. At a point approximately twelve and a half miles West of the diversion point and in the SW¼ of the NW¼ of Section 5, Twp. 6 North Range 34 E. W. M., the canal enters a syphon, through which it crosses Pine Creek Valley and emerges therefrom in the NE¼ of the SE¼ of Section 12, Twp. 6 Range 33 E. W. M.

By decree in the Superior Court of the State of Washington for the County of Walla Walla, in the case of State of Washington, plaintiff, vs. Charles Achermann et als, defendants, No. 19075, the Walla Walla Irrigation Company, under Proof No. 570, was given a right from the Walla Walla River, by appropriation under a priority date of 1892, to irrigate 7000 acres of land with a maximum amount of water of 93.333 c. f. s. from April 1st to July 1st, and 70 c. f. s. of water from July 1st to October 1st, subject to the following Note:

> That claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the referee, to-wit, on the 29th day of March, 1926, is entitled to use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st; 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said land may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics.

In the year 1928, an irrigation district was formed, known as the Gardena Farms District, which acquired the rights of the Walla Walla Irrigation Company.

In the beginning, J. F. Boyer, T. J. Kirk and W. F. Courtnay caused preliminary surveys to be made and a canal route to be located. Several notices of appropriation were posted at the proposed point of diversion and recorded in the office of the proper recording officer of Walla Walla County, State of Washington, copies of which, with date of record, are hereto attached, made a part hereof and marked Exhibit "B", "C" and "D" for diversion from the Walla Walla River and Exhibit "E" for diversion from the Little Walla Walla River. No diversion was ever made from the Little Walla Walla River.

In the spring of 1892, E. C. Burlingame, a contractor, became interested in the project and made further surveys and investigations of the route of the canal, and thereafter acquired an interest therein.

Soon thereafter in the same year a corporation was formed, known as the Walla Walla Irrigation Company. On November 5, 1892, formal conveyances of the rights of the individual appropriators were made to the Company, by deed recorded January 24, 1893, in Book 53, at page 179, Deed Records of Walla Walla County, Washington.

Mr. Burlingame performed the construction work for the Company using his own equipment and teams up to the time of the formation of the irrigation district which succeeded to the rights of the Company in 1928.

In August 1892 actual construction work on the canal was begun.

Prior to the year 1905 the canal was constructed from the diversion point in the McBean donation land claim in the SW¼ SW¼, Section 3, Twp. 6 North Range 35 E. W. M. along the route of the canal as shown on the official map herein, to a point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. where the map indicates that the canal divides. From said divisional point one division of the canal was constructed in a Southwesterly direction into the State of Oregon, and also from said divisional

point, prior to the year 1905, one division was constructed in a Northwesterly direction along the route indicated on the map to a point in Section 5, Twp. 6 North Range 34 E. W. M. about a mile from the upper end of the syphon.

In the winter and spring of the year 1905 an inverted syphon was constructed from a point in the SW¼ of the NW¼ of said Section 5, to a point in the NE¼ SE¼ of Section 12, Twp. 6 North Range 33 E. W. M. from which point the distribution system for the irrigation of the lands West and South of the syphon was constructed and has been extended as the demands of irrigation required. This syphon has a head of 145 feet, carries the water of the canal across the valley of Pine Creek a mile and a half in width, and is built of wood staves and steel bands. It was orginally of a diameter of 38 inches and has since been replaced by Gardena Farms District by one 44 inches in diameter.

For the first three miles of the course of the canal from the river the soil conditions presented no serious difficulties in construction. From there to the head of the syphon the course of the canal was in light and ashy soil requiring the canal to be puddled and causing some breaks and slides. The excavation and filling was done with teams and scrapers.

As a part of this construction work there were cuts two of which were approximately 26 feet in depth at their deepest point, one about 1500 feet and the other about 1000 feet, in length. Some fills also had to be made. The canal was constructed 16 feet on the bottom from the diversion point to the division of the canal at the point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. and from that point to the head of the syphon is now 10 feet on the bottom, all with side slopes of 1½ to 1 and with a depth of about 6 feet. The canal has a fall of .5 of a foot to a 1000 feet and a capacity of 150 c. f. s. in that portion with 16 feet bottom.

• • • • •

Such records of the Company as are now available do not segregate the cost of construction of the canal which began in the year 1900 and which was constructed from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon.

In the year 1910 the Company entered into arrangements to receive sewage water from the City of Walla Walla and during the years 1910, 1911 and 1912 expended $49,253.92 for concrete sewer pipe, $3954.02 for construction work, $1471.64 for engineering, and $1771.60 for rights of way, for the purpose of conveying such sewage water to the Company's canals. This water was used until the year 1924 when such use was discontinued and the works abandoned, with the exception of a small part of the concrete pipe used for a spillway from the canal. From about 1920 to 1924 the Company contracts for the sale of water contained the following clause: "It is understood that sewage water from the City of Walla Walla is part of said water supply."

In the year 1907 the Company expended $798.00 in investigation of reservoir sites. No reservoir has been secured. The Company also expended for the drilling of wells, the following sums: In 1905, $240.50; in 1909, $6155.50; and from 1910 to 1913 the sum of $441.25, and in 1924 and 1925 the sum of $3149.08, making a total of $9980.33 expended for work in an attempt to develop an additional water supply from wells, which was without result.

Water was first diverted from the river into the canal in the year 1893 for puddling purposes and turned out through the spillway into the West Little Walla Walla River. In the year 1898 water was first used for irrigation when 63 acres along the line of the canal were irrigated. In 1899, 20 additional acres were irrigated but these latter mentioned lands have since been abandoned. In 1901, 280 acres were irrigated in Oregon from the canal running from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon, and between 1901

and 1918, 72 additional acres in Oregon were irrigated from the canal, but the irrigation of these lands was discontinued in 1919, when the Company abandoned the operation of this canal. These lands are now irrigated from the Milton-Freewater and Hudson Bay Ditch. In 1898, 68 acres were watered from the canal; in 1899 two acres additional were watered in Washington, which were later abandoned.

In 1904, 193 acres were watered from the canal in Washington, including the 20 acres above mentioned as later abandoned. Approximately 1133.4 acres East of the syphon in Washington are now irrigated from the canal. The balance of the lands irrigated from the canal lie west and south of the syphon. Water was first run through the syphon in 1905 and used for irrigation.

(Tabulation of contracts for water omitted.)

The foregoing tabulation of water contracts sold by the Company up to 1930 totals 5793.09 acres. Of this amount 372 acres were later abandoned, leaving water rights outstanding for 5421.09 acres, of which there are 201.11 acres in Washington and 15.45 acres in Oregon for which irrigation payments are being made, but which are not now being irrigated. A survey by Oregon indicates that in 1933 there was irrigated from the system 4530.2 acres in Washington and 721.3 acres in Oregon, being 46.97 acres more than the above tabulation.

# EXHIBIT "F"

## WALLA WALLA IRRIGATION COMPANY—DEVELOPMENT BY YEARS

| Years | Construction | Wood Pipe | Concrete Sewer Pipe | Concrete Pipe | Reservoir | Engineering | Rights of way | Wells | Totals |
|---|---|---|---|---|---|---|---|---|---|
| 1892-1893 | 7,727.09 | | | | | 1,536.80 | 2,836.50 | | 11,600.39 |
| 1894-1895-1896 | 11,812.90 | | | | | 50.00 | 301.50 | | 12,164.40 |
| Totals | | | | | | 1,586.80 | 2,638.00 | | 23,764.79 |
| 1897 to 1904 Inc. | 27,536.87 | | | | | 218.45 | 2,214.67 | | 29,969.99 |
| Totals | 47,076.86 | | | | | 1,805.25 | 4,852.67 | | 53,734.78 |
| 1905 | 27,307.47 | 15,218.29 | | | | 1,361.10 | 85.00 | 240.50 | 44,212.36 |
| Totals | 74,384.33 | 15,218.29 | | | | 3,166.35 | 4,937.67 | 240.50 | 97,947.14 |
| 1906 | 12,575.75 | | | | | 913.90 | 339.00 | | 13,828.65 |
| Totals | 86,960.08 | 15,218.29 | | | | 4,080.25 | 5,276.67 | 240.50 | 111,775.79 |
| 1907 | 7,405.32 | | | | 798.00 | | | | 8,203.32 |
| Totals | 94,365.40 | 15,218.29 | | | 798.00 | 4,080.25 | 5,276.67 | 240.50 | 119,979.11 |
| 1908 | 15,617.92 | | | | | 17.60 | | | 15,635.52 |
| Totals | 109,983.32 | 15,218.29 | | | 798.00 | 4,097.85 | 5,276.67 | 240.50 | 135,614.63 |
| 1909 | 16,653.39 | | | | | 857.70 | 800.00 | 6,155.50 | 24,466.59 |
| Totals | 126,636.71 | 15,218.29 | | | 798.00 | 4,955.55 | 6,076.67 | 6,396.00 | 160,081.22 |
| 1910 | 3,954.02 | | 34,389.70 | | | 1,471.64 | 1,771.60 | 122.50 | 41,709.46 |
| Totals | 130,590.73 | 15,218.29 | 34,389.70 | | 798.00 | 6,427.19 | 7,848.27 | 6,518.50 | 201,790.68 |
| 1911 | | | 14,713.67 | | | | | 178.75 | 14,892.42 |
| Totals | 130,590.73 | 15,218.29 | 49,103.37 | | 798.00 | 6,427.19 | 7,848.27 | 6,697.25 | 216,683.10 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1912 | | | 152.55 | | | | | | 152.55 |
| Totals | 130,590.73 | 15,218.29 | 49,255.92 | | 798.00 | 6,427.19 | 7,848.27 | 6,697.25 | 216,835.65 |
| 1913 | | | | | | | | 140.00 | 140.00 |
| Totals | 130,590.73 | 15,218.29 | 49,255.92 | | 798.00 | 6,427.19 | 7,848.27 | 6,837.25 | 216,975.65 |
| 1914-1915 | 252.95 | | | | | | | | 252.95 |
| Totals | 130,843.68 | 15,218.29 | 49,255.92 | | 798.00 | 6,427.19 | 7,848.27 | 6,837.25 | 217,228.60 |
| 1917 Dam at river | 1,300.38 | | | | | | | | 1,300.38 |
| Totals | 132,144.06 | 15,218.29 | 49,255.92 | | 798.00 | 6,427.19 | 7,848.27 | 6,837.25 | 218,528.98 |
| (Gardena) 1920 concrete pipe | | | | 5,400.50 | | | | | 5,400.50 |
| Totals | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.00 | 6,427.19 | 7,848.27 | 6,837.25 | 223,929.48 |
| 1924 | | | | | | | | 1,500.00 | 1,500.00 |
| Totals | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.00 | 6,427.19 | 7,848.27 | 8,337.25 | 225,429.48 |
| 1925 | | | | | | | | 1,649.08 | 1,649.08 |
| Grand totals | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.00 | 6,427.19 | 7,848.27 | 9,986.33 | 227,078.56 Cost of system |

The item "Wood Pipe" $15,218.29 is the wood stave pipe across Pine Creek to Gardena. Estimated cost about $25,000.00. The item "Concrete Pipe" 1920—Gardena is the pipe extending West along South line Section 5-6-33 to Paine land.

A narration of the testimony of the witnesses on the part of the State of Oregon is as follows:

*E. C. Burlingame*

I am 75 years of age; reside in Walla Walla. Became connected with Walla Walla Irrigation Company in 1892. (R. 458.)

At request of Mr. Courtney and Mr. Boyer. (R. 460.)

I took an engineer and started over the survey, found a short cut, reported to Mr. Boyer, became one of the company, took charge of construction work and started construction with a man and team, plowing furrows and scraping out ditch. Remained until ditch was completed. (R. 461, 462, 463.)

In 1892, worked first a few days to comply with the law, then later in same year put in grading outfit and camps and went to work and continued until depression of 1893 attacked me. (R. 464.)

We shut down in the fall of 1893. Left one man and four teams and the camp equipment on the work. I kept that one man here for about 2 years. My headquarters were in Yakima. In '95 we came back and started construction work. (R. 465.)

I had 3 or 4 men besides myself until the spring of '96. In spring of '96 I went to Montana with the outfit and left a man puddling the ditch. I finished the big cut in '95. (R. 466.)

From '92 to '96, canal had progressed about 2½ miles out of a total length proposed of 25 to 27 miles. I came back in fall and winter of '97, put a crew to work of 3 or 4 men with four horse teams and a plow team. The Locker place was first land irrigated in '98 or '99. (R. 467.)

There were 68 acres in that farm. Irrigation was started that year. (R. 468.)

In 1892-3 spent $11,600.39 for engineering, construction and rights of way, $7727.09 of that for construction. In 1894-6, $12,164.40 for construction. Left an outfit there 2

years. In fall of '95 or spring of '96, I came over with my foreman and small outfit of teams and went to work at Locker place. It was 1899 when I started to irrigate Locker place. In 1898 I worked for U. P. at Potlatch near Lewiston, also on a placer mine near Grangeville, also water works for that town and also on O. R. & N. Snake River cutoff. (R. 469, 470.)

There was no construction during time I was working elsewhere, except one man kept there. I went to Montana and came back from Palouse ditch and put in the winter of '97 and spring of '98 on the canal on the Locker place. Then went to Wallace, Idaho. In the summer of '99 and spring of 1900 I worked on Locker place. (R. 471.)

Then worked on railroad at Hamilton, Washington. There was no construction going on during the time I was gone. I was irrigating the Locker place. '96 was first year I took out water and carried it past little Walla Walla. Used the water for puddling the ditch. In 1900 was first year I irrigated Locker place. I built a house and put a man to work there and did a good deal of work on the ranch in 1900 as well as the canal. In 1901, I did no construction work. (R. 472.)

In 1902, I was building Kennewick canal for the N. P.-R. R., and in August of that year, I sent men and teams and commenced work again on the canal. About 3 fresnos and a foreman. Finished Kennewick job in February 1903 and then moved to Walla Walla Irrigation Company ditch and went to work. Took charge myself from then on. (R. 473.)

I had a map of the project made by E. H. Guilland. Ex 0 23 is tracing of original survey. (R. 474.)

Referring to Walla Walla Irr. Co. on map and line of dots beyond, map shows that somebody has added a new line of marks not made by the original engineer. I do not know who made them. They were not originally on the map. This map was in my office. (R. 475.)

The map as originally drawn and before the alterations was a correct representation of my then plan for the Walla

Walla Irrigation Co. canal. The original plan was according to dotted line running down across the State line into Oregon. (R. 476.)

It is a part of the Company records. Ex 034 is a part of the original survey. (R. 477.)

Some red crosses on it have been added; probably indicate new land to be taken in, some contemplated change. Referring to line on blue print beginning in NW¼ Sec. 13-6-34 and extending to center of Sec. 5-6-34 and marked "lateral", this is now the main canal. Referring to line beginning at division point in Sec. 13 and running southerly and westerly across state line into Oregon, marked "main canal", that indicates the route of the proposed main canal up until 1903. This blue print is part of the records and files of Walla Walla Irrigation Co. (R. 478, 479.)

Ex. 0 35 is part of records and files of Walla Walla Irrigation Co. Referring to words in white ink "W. W. I. Co. main canal" and line drawn through word "lateral" and line in white ink from line in Secs. 5 and 6 to present syphon, those were put in after blue print was made. I do not know by whom or when. Referring to word "south" in white ink and a line drawn through "main", I do not know when or by whom made. Without those changes, blue print delineates original plan of W. W. Irr. Co. canal. (R. 480, 481.)

Present construction is about as outlined by the changes. I made the change to the present construction in 1903. Made change because I discovered that we were leaving out the best land in Gardena that could not be irrigated as originally planned. (R. 482.)

The high lands in the east end of Gardena, consisting of 2½ to 3 sections, could not be irrigated under original plans. We started to build Gardena lateral in 1904. In winter of 1903-04 we decided to build syphon, that it would save water, get more land, and the land would pay the cost of the pipe line. (R. 483.)

At that time we had constructed into Oregon 15 to 18 miles to about center of Sec. 19-6-34 in Oregon. I had run water across Pine Creek to a mile east of that point and irrigated the Neitert place. The canal in Oregon, originally the main canal, has since been abandoned, about 1918 or '19. After that, Hudson Bay took over the best of it, beginning about ½ or ¾ mile east of Pine Creek. Original canal was surveyed and stakes set through Gardena. Syphon was constructed in 1905, and land first irrigated on the hilltop in Gardena. Up to 1919 I irrigated my Oregon ranch from what was originally intended to be the main canal. It is now irrigated from Hudson Bay. Owing to financial trouble I had to go slow in construction. There was nothing else. When I first went up the Walla Walla Irrigation Co. in 1892, I made no investigation of water supply. Took it for granted that these men, old timers that lived here, knew all about the river. (R. 484, 485, 486, 487.)

After I completed canal and commenced using more water, I discovered the river didn't have as much water as we thought and began to investigate. I went up the river several times, above the McCoy Bridge, clear up to the East side ditch, looking for hostile diversions, if somebody was taking the water that belonged to us. I found no one. The river, Tumalum, between Nursery Bridge and McCoy bridge, was bare rocks, dry. (R. 488.)

I went up there in August and September. We were getting shy in August. Generally didn't have much trouble in July. I went up once in July, looking for somebody starting new ditches, but didn't find any. I wasn't interested in Hudson Bay ditch then. I became interested in the Hudson Bay ditch in 1911. (R. 489.)

I then began to look after the operations of that company and its water supply. I employed Mr. Bowman as ditch walker on the Hudson Bay ditch. As part of the Hudson Bay system, a canal leads from Tumalum to Little Walla Walla, emptying below Peacock Mill and above the frog, and has a headgate and diversion dam. The first thing

I did after getting control, I put men in there and tore out all the trees and cleaned out the ditch. (R. 490.)

I diverted water from Tumalum to Little Walla Walla through that ditch. During shortage I let water down once in June, 1928, a thousand inches. Did not see how far it went, but ditch walker, Orin Bowman, did. (R. 491.)

At time turned water, I don't think Tumalum was quite dry. Always a small stream at Highway bridge. (R. 492.)

I have been up above McCoy bridge many times hunting for water. Always dry between McCoy and Nursery bridges in August or September. Might have been tiny seepage scattered through rocks. I know Carl Hartvedt. I hired him in 1917 to work for Walla Walla Irrigation Co. (R. 493.)

I do not remember ever going with him to where Hudson Bay takes out of the Tumalum and closing the Hudson Bay to turn water down to Gardena. I couldn't instruct Hartvedt to go up there and turn it down. The gate at the end of the ditch is kept locked and Bowman carries the key. I never instructed him to turn it down. As a result of the shortage of water, I made an investigation as to possible reservoir sites. (R. 494, 495.)

Spent $796.00 in surveys in Blue Mountains and all over the country looking for storage sites. Found nothing worthy of consideration. We dug two wells to develop Artesian water. One at College place, the other near headgate of ditch, spent $9986.33 in 1924 or '25, but did not secure any water. (R. 496.)

Also as a result of shortage of water, I arranged to get sewage water from City of Walla Walla, spent about $50,000 for pipe line and right of way. Expenditures show in Ex. F of Stip. No. 5 in 1910 of $34,389.70 for sewer pipe, $1471.64 for engineering, $1771.60 for rights of way and a total of $49,255.92 for concrete sewer pipe, for that purpose. This includes construction charges. I built the pipe myself. These expenditures were in 1910, 1911 and 1912. We expected to get 10 c. f. s. of water and built a pipe for that, but only got a maximum of 6½ c. f. s. We got in litigation

over it and abandoned it, 5 or 6 years ago. All this expenditure for sewer line, wells and reservoir sites produced no water that is now being used. The development in Gardena was largely completed at the time I left, before Gardena Farms District was organized. I left about 1930. In that development, took no water down the Tumalum in short season during July, August and late June, only what rises at and below McCoy Bridge and spring branches, Big Spring, East Prong and numerous branches above the headgate. Rights up Yellowhawk and Mill Creek were shut off to supply Gardena before I left the company. (R. 497, 498, 499, 500, 501.)

(Cross examination)

Canal flows west through E½ Sec. 11. Sec. 12 is highest irrigated land in Gardena irrigated by gravity flow.

Elizabeth S. Burlingame, my wife, made desert entry on part of W½ Sec. 11-6-33 on Feb. 11, 1901. I also made a desert land entry on part of W½ Sec. 11 in 1893. (R. 502.)

I turned water in canal when I reached Little Walla Walla, 1⅝ miles, and let it run into Little Walla Walla. Put in large tracts of orchard in Gardena in '05 and '06 and sold some of them with contract to care for them, for five years. In 1917, employed Hartvedt. He stayed until 1922. Came back in 1926 and has remained to the present. He is a competent man. I was witness in Walla Walla adjudication in Washington. (R. 503, 504.)

In 1917, when Mr. Hartvedt went into my employ. Mr. Paine and I owned all the stock in Walla Walla Irrigation Company. A few years later I bought out Mr. Paine. (R. 506.)

At same time we owned one share over 50% of Hudson Bay stock. I bought Paine stock and since then control the Hudson Bay Co. (R. 506.)

Walla Walla Irrigation Co. has large holdings in Gardena, 500 or 600 acres, irrigated from canals. (R. 507.)

I am farming a large area irrigated from Hudson Bay ditch. (R. 508.)

*Orin Bowman*

Orin Bowman lives at Milton, Oregon, employed on Milton, Freewater & Hudson Bay Company canal since 1919. (R. 510.)

I have charge of distributing water and caring for ditch. Have charge of headgates. Have had charge of headgate where Hudson Bay canal takes out of Tumalum since 1920. It is locked with a padlock and I carry one of the keys. (R. 511.)

Gate is closed when there is a surplus of water. We turned water down the Tumalum once to get water to Gardena. That was in 1928 for a couple of days along about the 1st of June. We turned down about 1000 inches or 25 c. f. s. It went pretty near to McCoy Bridge in two days. (R. 512.)

After seeing it disappear there, I went back and turned it down to the users who had it in the first place instead of running it into the ground to waste. I turned it to Hudson Bay canal and continued to use it. It lasted about a week. That is the only time it was turned down. (R. 513.)

I was present once when Hartvedt and Burlingame came over and wanted water turned down. Mason, the deputy water master, would not turn it down. During period of shortage, as fast as water drops in river, we keep taking up water until it is all gone. (R. 514.)

During the time I was on the ditch, never another time was water turned down to Gardena. I live at the headgate on Little Walla Walla, at the frog. Every morning and evening, during irrigation time, I went to Tumalum headgate. At low water time I would seal up the Tumalum dam tight and divert all the water from Tumalum to Little Walla Walla. (R. 515, 516.)

(Cross examination)

Went to work for Hudson Bay Co. in fall of 1919. A new headgate was put in, in 1920, in the fall, at the Tumalum, under supervision of Carl Hartvedt. (R. 516.)

It is concrete form with wooden gate. He also constructed measuring weir just before canal enters Little Walla Walla. Not used now. (R. 517.)

A dam of rocks turned water in. Don't know whether Hartvedt had a key to the headgate. (R. 518.)

They never bothered it. Water could be turned down Tumalum either by removing dam or closing headgate. When I turned water down in 1928 I went down in sight of McCoy Bridge. I went to headgate every morning to regulate it in cooperation with water master. (R. 519.)

(Redirect examination)

Water master did not require me to cease taking water from Tumalum. I adjust the headgate to keep from taking too much water, keep the right amount regular, not adjusted while short of water. Hartvedt never came to me to turn water down and I never found gate changed. Several times found flash boards removed. (R. 521.)

Either someone kicked them out or a log came down river and knocked them out. I put them back as quick as I could get them in. They never remained out as long as two days. Water master requires me to regulate gate at Tumalum all the time, that is, when there is plenty of water. The river raised last night and I had to go over there and pull out some of those boards to guard against flooding. Water master does not require me to adjust to cut down water where Hudson Bay is short. One gate is at the Tumalum, one at the frog. We regulate both, but amount of water that goes into ditch for distribution is regulated at the frog. (R. 522, 523.)

*William Forsythe*

William Forsythe lives northwest of Freewater about 2 miles. Have lived there 48 years and been in and around Milton since 1879. Farm is 1¼ miles west of Tumalum, 21½ acres growing fruit, apples, strawberries, tomatoes, cherries. I worked in meat business in 1882. Saw Tumalum

in 1880. In 1882, I run a butcher shop in Milton and crossed Tumalum during harvest season twice a week over and back, peddling meat. Crossed about a mile or 1¼ mile below railroad bridge, beside the Nursery bridge. Stream bed in 1882 was dry in July and August. (R. 525, 526, 527.)

Road was fixed with straw and manure to break the jolts, because rock was so big. After 1882, worked in shingle mill, then went to Salem two years, and came back to present farm in 1886. I have seen stream most every year. I never found any water in it after the middle of July. Usually went dry about first of July, some years earlier. (R. 528.)

I have four wells. Water in them rises in February or March and they are dry in January. In summer I have water very near to the top of the well; rises there in May or June. Wells are about 36 feet deep. Loose gravel for about 12 feet from the top then cement gravel. Gravel would have soil mixed with it for about a foot or two. (R. 529, 530.)

In early years helped turn water from Tumalum into Little Walla Walla. The first year was 1886. Had to dig a new channel altogether. The flood water had washed the Walla Walla river full of gravel and we had that all to dig out. (R. 531.)

The work was done at the division point of the two rivers and turned the stream into Little Walla Walla for the purpose of irrigating. In 1882, or 1883, the river changed its channel for one-fourth mile just above the division. River down the Tumalum changes its channel more than up river. (R. 532.)

Prior to 1886, they had to do work on the channel to turn water into Little Walla Walla. (R. 533.)

After 1886, we didn't have to dig a new channel every year, but we had to put in dams to get the water into the Little Walla Walla. Always left some water in Walla Walla; I don't know how much. Had to fix dams several

times through the summer, most every year, because the water was lower in the river. (R. 534.)

Before the decree, there was a good deal of water trouble. (R. 535.)

(Cross examination)

I settled in Milton in 1879. No change of channel between 1879 and 1882. I couldn't find plenty of water in the early days. (R. 536.)

In July and August in early days I worked in the mill, had two mill races. Miller's mill and the shingle mill, and we had to take about all the water there was to get the two ditches filled full. Shingle mill was just below Miller mill. It's all gone now. After fall rain started each year, water would flow in Tumalum. (R. 536, 537.)

Dug first well about 1896 or 1897. I dug one in 1906 or 1907 and another on 20 acres. In first well observed rise and fall of water. (R. 538.)

At time it was first dug, it raised just the same as at present. I get my irrigation from the Ford branch. That's the reason we worked at Tumalum division, to get more water down Little Walla Walla. All the neighbors would go up there, take turn about going up there and turning water. Now the irrigation district looks after that. (R. 539.)

(Redirect examination)

Peppers bridge is in Washington, 1½ miles below McCoy bridge. I use wells for irrigation most generally from about July 1 on. I use electric power. Costs about $25 to $30 a month for our motor. I have three and have paid as high as $73 a month for three of them. I used wells as quick as I could get machinery on them. I didn't need to pump so much then as I do now. I had a better water right. (R. 540.)

I could go up river at nights then and I can't do it any more. When water master came on, that cut off my regulation. I didn't get up the river so much. I had to dig more wells. (R. 541.)

(Recross examination)

Pumps are on windlass platform to raise and lower with rise and fall of the water. (R. 542.)

*Elba Rogers*

Elba Rogers resides 1½ miles north of Freewater on highway, three-fourths mile west of Tumalum. Came to this country in 1883. (R. 543.)

I was then seven years old. Remember Tumalum from about 1890. Like any kid I was fishing and swimming between Nursery and McCoy bridges, and in July and August there was no fishing and swimming over there. We had to go down to the McCoy place to find any swimming. There was no water; it was dry. The first year I remember was 1889 or 1890. Outside of a rain heavy enough to cause quite a flow I never saw the time in July or August that there was any water ever passed over that bar. (R. 544, 545.)

They used to make roads of straw and manure across the dry bed. Stream bed was not as wide between banks as now. Stream changed from place to place, leaving rock bars. (R. 546.)

Just below railroad bridge about one-half mile, the water would disappear. In that stretch, for a mile below the railroad bridge, water sinks more than it does down toward McCoy bridge. My father and I worked up at the divide of the Tumalum into the Little Walla Walla. The first year my father worked there was 1884 or 5. (R. 547.)

The river has a habit of washing out the main river and filling the mouth of the channel that comes our way with gravel, which has to be taken out and a little later on it has to be dammed to turn the water into the Little Walla Walla. I have helped do that many years. The first year I remember working was '90 or '91. (R. 548.)

Raking out the channel and putting in the dam would be done three or four times a year. There was no measure-

ment. Sometimes the east siders would knock out the dam and we would have to go back the next day and put it in. (R. 549.)

On my place, instead of digging a well we tapped some seepage by a wooden box, afterwards changed to tile, brought it to the top of the ground for irrigation. This seepage started about three days after irrigation started above there. Do not use it now. (R. 550.)

The effect of irigation is to cause the wells to raise, and later in the season when the evaporation is so great, the wells decrease. The wells start to rise after they start to irrigate. I have a well which I keep for insurance, to use in case of need. I don't use it very often. It is 108 feet deep. (R. 551.)

The well is dug 38 feet and drilled the balance of the way. At first there will be 7 to 10 feet of water in the dug part, and then after I start pumping I soon pump down from the drilled hole. The soil beginning at the top is about a foot, then there is gravel from 8 to 12 feet and then there is cement gravel. After you get down 2 or 3 feet, clear down to the cement gravel, there is hardly any soil, it is porous. (R. 552.)

My well does not reach through cement gravel. There are places in the cement gravel we call veins that are full of water. In spring, water stands in our curb above the top of the cement gravel. (R. 553.)

If I stop pumping after the water is below the dug well, it will fill up again in two or three hours. My pump throws 165 gallons a minute. (R. 554.)

After water master took charge and began to regulate irrigation water, I had to drill well deeper. Cutting down surface irrigation shortened the water supply in my well. (R. 555.)

I raise principally tomatoes. Set them out last of April or first of May. Start to irrigate towards the last of May.

Rather not irrigate much during bloom time. First fruit sets in May. (R. 556.)

After I start to irrigate, for several years we were on a 4-day rotation which was too long, so we cut down to a 3-day rotation, which comes about right. I use 1½ inches per acre. My ditches are one-half length of my 5-acre tract, 20 x 80 rods. (R. 557.)

I have raised tomatoes since 1906. Start picking them between first and eighth or tenth of July. Harvest for general market lasts till about sixth to eighth of August. (R. 558.)

Canning and home consumption tomatoes then are harvested up to first of September. I raise about 600 lugs of 50 or 60 pounds each, per acre. My 3½ acres produced $2,786 gross one year; about 75 per cent was net. (R. 559.)

Water is measured to me across a 40-acre tract. Water master turns me 1½ miner's inches per acre. (R. 560.)

If water was cut down I simply would have to quit the tomato business. Don't leave enough water in the heat of the season as it is. The rocky soil furnishes more heat. The rocky places hold less water and store up heat in the daytime and sometimes get too hot if you do not have necessary water. Gravel belt is clearer of frost than any other section of the Walla Walla Valley. The first effect of shortage of water that we notice is withering, then two or three days after that, we notice the fruit is smaller as it ripens. The smaller fruit goes into seconds and then culls, because too small for market. The amount of water heretofore received in order to keep tomatoes up to first grade is necessary. (R. 561, 562.)

Our tomato crop comes at the tail end of the California crop and earlier than other places in the Northwest. This gives us a big advantage as to market and prices. (R. 563.)

In irrigating my land, I take eight rows at a time. I get over my land in 24 hours, that keeps us irrigating night and day. We apply water 24 hours out of each three

days, except about an hour every third irrigation to a small grape patch. (R. 564.)

In irrigating there is a little run off. Sometimes enough for my neighbor below to use it. Other times not enough. It is all used and none wasted. I have put up greenhouses. Invested better than $6,000 in them, to supply plants for myself and others. (R. 565.)

About 100 acres in tomatoes this year. Last year about 300 acres. Average yield is 500 to 600 lugs per acre. Roots go as deep as you plow your ground, no deeper. I aim to plow my ground 10 inches. (R. 566.)

District is especially adapted to tomatoes. They sell for about $1 per lug. Average return of $400 per acre. Acreage will increase when people can buy. I need an increase of water over 1½ inches per acre for the last two weeks of July up to August 8th. It would produce better fruit. (R. 567.)

We need more water because at first of season ditches are fresh. Water can seep in better. Later we have more fruit, tromped ditches, hotter weather, more evaporation. I believe during that time we should have 1¾ to 2 inches per acre. (R. 569.)

Crockett branch from N½ of section 26 on north is dry during irrigation season. The Ford branch at the lower end also goes dry. (R. 570.)

(Cross examination)

By rotating I get a head of 4½ inches per acre for 24 hours every third day.

When my time comes, I irrigate continuously for 24 hours, day and night. Ditches are 3 feet apart, and run not quite 40 rods. Our head ditch, laterals, tail ditch and turning ground would cut off 2 rods, one rod on each end. Our lateral comes out at one end, another in the center. When we irrigate, we take 8 to 10 rows on east side and the run off is caught in tail ditch and carried to west side to irrigate 3 or 4 rows. (R. 572, 573.)

Acreage increased up till last year and there was a decrease. When I came on place I was $29 in debt and had nothing. I have made that place since, all off of the place. (R. 574.)

Our tomatoes are not earlier than Kennewick. We should have same amount of water in latter part of season as the early part. Begin to irrigate in May, and continue till crop is harvested. Growers for the cannery picked into October last year. I get water from West Branch of Crockett. (R. 575, 576.)

I have a well. Some years don't use it. Last time was 3 years ago. Well is curbed for 8 feet, 30 feet not curbed. Cement gravel is just as solid as curbing (R. 577.)

Above cement gravel it is pure gravel for first 3 to 5 feet, thence from there on up there is more or less soil in it. I dug my well in 1912 or 1914. (R. 578.)

At first my well was dug 16 feet, thence to 38 feet, then drilled to 66-foot vein, and then to 108 feet. I haven't noticed any difference in the average water level in the summer during the last five years. (R. 579.)

(Redirect examination)

Water was left in Tumalum at division point to go down for east side. (R. 580.)

They would take all of the water that was left. (R. 581.)

*Charles Schwald*

Since 1891, lived on farm 2¼ miles north and ½ west of Freewater. Farmed McCoy place at McCoy Bridge in '92 and for 3 years thereafter. McCoy place is on east side of river, my place is on west side about two miles from river. I crossed river in front of McCoy house from '92 on. The river was dry; went dry around first of July. Also crossed river for 10 years peddling fruit. Crossed at Van Slykes ¾ mile south of McCoy place, sometimes daily, sometimes weekly, during this time. In summer time, river was dry. Water starts to run again late in the fall, about October. (R. 584, 585, 586, 587, 588.)

I worked up at dividing point of Tumalum and Little Walla Walla, first in 1891 and continued until after water master took charge. I had charge of division of water at the dam for more than 10 years, put in the dam and took care of it. That began about 1902. (R. 589.)

The mill put in 30% of the work, the farmers 70%. We always took half from the river under the bridge. The mill race was not counted in. The balance went to the east side. (R. 590.)

After I quit peddling fruit, I visited friends across the river twice a month. From 1892 to present time Tumalum was dry in the summer time. Lower end of Ford was dry from 1891 to present time. (R. 591.)

Water begins to raise in springs in Ford branch ½ mile below my place. (R. 592.)

(Cross examination)

When I had charge of the division, I represented the Walla Walla Irrigation Union, a corporation composed of farmers. I have 10 acres permanent water right and 90 acres surplus water right. (R. 593.)

*Alta Rogers*

Lives one mile North of Freewater and a quarter of a mile west of the State Highway. (R. 595.)

Lives three-quarters of a mile west of the Tum-a-lum. Came to the county in 1882. Was born in 1878. First knew the Tum-a-lum when ten years old, in 1888. Went swimming there and played along the river and went fishing almost daily there when young. Since he has been in business for himself he has been along the river more or less. From the Nursery bridge to the McCoy bridge the river went dry in the summer from the middle of June to the middle of July. (R. 596.)

River staid dry until the latter part of September. The bed of the river through that stretch is gravel and loose rock; cobble stones without soil content, and that condition

extends for one and one-half miles North of the Nursery bridge. From there on there is some soil mixed with the rocks. (R. 597.)

In the rocky stretch, all water that comes down during the summer sinks. He has known the Crockett branches and the connecting channel between them, and the East Little Walla Walla ever since he lived there. Before the water was adjudicated the older rights above took all the water, and those near the lower end of the stream did not get any. At the lower end the connecting channel went dry. This has continued since 1888, or 1890. (R. 598.)

After the water master went on, the water flowed better to the lower users, but no water went past and into the East Little Walla Walla in the summer time. (R. 599.)

The connecting channel between the Ford and West Little Walla Walla went dry near Charlie Schwalds place and was dry until the point where the springs rose in the channel, and this continued from 1890 down. (R. 600.)

I irrigate 15 acres. Along about 1890 I used to go with my father, C. D. Rogers, to work at the divide between the Tum-a-lum and the Little Walla Walla. From then on, every year to my knowledge, the water was diverted into the Little Walla Walla. I would judge about one-half of the water was diverted. We left enough water to run down to the east side. Before the water master went on the older fellows farthest up the streams took what water they wanted, and those at the lower end had none. (R. 601.)

They used more water before the water master came on than they did afterwards. (R. 602.)

I raise apples and have been in the tomato business for a good many years on another tract of ground. My home place is 15 acres. I have farmed it since 1913. My trees are 20 years old. I have 5 acres of Delicious apples which are 12 years old. I have a main-head ditch across the upper end of my ground. There are ten acres of my land that is 80 rods East and West and 20 rods North and South. My land lays in an "L" shape and 5 acres is 40 rods East and West

and 20 rods North and South. From my head ditch I have a lateral that comes out and covers every two tree spaces, which is 8 ditches. I take it out of the head ditch into these laterals, run it through 8 ditches, catch it on a piece of ground North on the ten acres, and use the tail water on that so as not to waste any.

My ditches are just 20 rods long. My land slopes four feet to 320, with about a four foot fall. The reason I know this is that I built a levy to run water back to my well, and I had to raise it four feet to go 420 feet. There are two or three places in my orchard that are good ground, and on these I have to put in checks, but most of my ground is rocky and I use no checks there. (R. 603.)

It takes three or four days to get over my place at an irrigation. I don't leave the water running. As soon as I get through my rows I change it into others. I have water for ten acres and run a two-inch pump. (R. 604.)

My period of rotation is three or four days. I have an inch and a half to the acre for ten acres, but in July and August it is always an inch. I rotate with the man above me. He gets it two days out of the week, and I get it five days. When irrigating my land I get the head of water that would be coming to him. He has five acres. We have 32″ altogether, besides what I pump. (R. 605.)

It takes from one to two hours to get through my 20 rod rows. Sometimes three hours in the rocky part. The hot weather in the summer time makes a lot of difference. The hot weather causes greater evaporation in the rocky land. I use a cover crop of alfalfa. I spring-tooth it in the spring and try to keep the weeds down. I let the alfalfa grow all summer and never cut it because it saves the moisture by leaving it. I do not use a rolling cutter upon mine, although most people do. (R. 606.)

I spring-tooth in place of using a cutter. By spring-toothing I work the top ground into the soil and that makes more humus, and makes a mat of the plant growth which takes the place of a mulch. The method of growing a cover

crop without harvesting it is general in the community, and is accepted as the proper method of operating the orchards. It has been tried otherwise, but if the crop is cut it is detrimental to the orchards and harder to irrigate. The cover crop is a material saving of water.

My well is 43 feet deep, and is a dug well. (R. 607.)

It is six feet square. There was about twelve feet of loose gravel on top until I came to the cement gravel. About three feet of the loose gravel had soil mixed with it; the balance is loose and must be curbed in order to keep it from caving in; it has no soil in it. The cement gravel is solid and will not cave. Water seeps through the cement gravel in veins. (R. 608.)

When I dug the well I had to shoot the cement gravel. When I went on the place in 1913 the well was there, and was 20 feet deep. About 1916, 1917, and 1918 I deepened it several times, but did not get entirely through the cement gravel. In the spring of the year when they start irrigating the water raises in the well to the curb, and within ten feet of the ground. In the winter time the well is dry. It has been dry now for three months. (R. 609.)

The water is just starting to raise in the well. They have started to irrigate above me, and if they all started to irrigating, the water would raise to within ten feet of the top in a week's time, but when only a few start it takes longer. I usually start pumping in May. I pump for the 5 acres, and to supply any deficiency in the water for the 10 acres. I mix the well water with the creek water. (R. 610.)

Pumping lowers the well, but this is not noticeable until the latter part of July or August when the well gets pretty low. I never have pumped the well dry, but in 1930 I could see the foot valve for a month; that was a dry year. I use electric power. I judge my well throws 125 gallons to the minute. My power bill runs from $25.00 to $30.00 per month. (R. 611.)

There are water users near me and adjacent who irrigate through the whole season. I don't get my 1½ inch of water to the acre throughout the year. It is cut down in July, about the middle of the month, and I must then use my pump to supplement my supply. I can't irrigate my ten acres of rocks without the pump. The 1½ inch is not a big enough head combined with the water I get from my neighbor. (R. 612.)

But by using my pump I can get along and raise crops. None of that land in and around Milton would raise crops without irrigation. Before irrigation it was bunch grass and sage brush, and would only grow stuff in the spring of the year. I grow apples and have grown tomatoes for twenty years. In raising apples I raise between 500 and 600 boxes to the acre on the 20-year-old trees; that is field boxes. (R. 613.)

I have 7 acres of Rome Beauties, and I average between 4,000 and 4,500 boxes of packed Rome Beauties; 80% fancy and extra fancy, and 20% "C" grade and culls. If I depended only upon the water from the river and without the supply from the well it would reduce the grade of my apples. (R. 614.)

Without water my apples would be small and would not color well and would make my farming operations unprofitable. I get around $1.00 a box, and it costs me 27 cents a box to raise them. Raising and packing is covered by this amount. My Delicious apples this year I sold for $1.00 a box loose. I had 2,002 boxes on 5 acres from 12-year-old trees. That is fancy and extra fancy only. On the 10 acres I can raise between 4,000 and 4,500 boxes of fancy and extra fancy. (R. 615.)

On the 15 acres I had between 6,000 and 6,500 boxes of fancy and extra fancy apples. This is near the average production for the district. Everybody takes care of their orchards about the same. After they start irrigating, the water in my well raises rapidly. The water comes on top of the cement gravel as near as I can tell. (R. 616.)

The water starts in at the very bottom of the well, and apparently from the veins in the cement gravel, because I could see it if it ran down the well. It does run down the walls later on. The irrigation water goes through the veins. (R. 617.)

## CROSS-EXAMINATION

Water flows through the connecting channels between the Crockett and the East Little Walla Walla during the fall, winter, and spring. The channel goes dry during the dry season. There are springs coming out below the connecting channel. The same is true of the connection channel between the Ford and West Little Walla Walla. (R. 618.)

The connecting channel between the Ford and West Little Walla Walla goes dry in the summer time, but water runs during the fall, winter, and spring. I have a cover crop of alfalfa between the trees. I re-sow this when it gets old. I have missed spring-toothing it some seasons. I spring-tooth it in the spring of the year, and prepare my small ditches if I spring-tooth it, and clean these ditches twice during the summer. (R. 619.)

I have seven (7) acres of Rome Beauties, 3 acres of Wine Saps, and 5 acres of Delicious. Last fall my apples brought a little better than $1 per box. The two years before that I lost money. Taking the seasons all the way through they will average a little better than $1 per box. (R. 620.)

The water master drove a nail in my board and told me that is where my water should stand to get my inch and a half of water, but in July and August it is never up to that nail.

The majority of the time I get two-thirds of my allowance. After I begin pumping I run my pump continuously day and night. It is not cheaper for me to run my pump all the time, considering the labor cost of shutting it off.

If I could shut it down part of the time I would be better off. I don't shut it down because I need the water. (R. 621.)

I run eight rills at a time. My Rome Beauties are 25 feet apart; my Delicious 25 by 30 feet; my rills run in a 25 foot width, and are 2½ feet from the trees, the nearest ones. I run four rills between each row of trees. I used to run five rows, but my water was too short and I had to cut it down so as to make it two rills on each side, and cut out my center ditch because I did not have water enough to get through in July and August. (R. 622.)

I have a catch lateral, but I cannot irrigate the 5 acres with the water from the 10 acres. I catch two or three ditches of the 5 acres; where I irrigate eight rows I catch two or three rows at a time below and get part of my orchard irrigated that way, and when I turn my water on the lower land I don't have so many rows to irrigate. When irrigating, I irrigate at night as well as day. I usually change the water about 10:00 or 11:00 o'clock at night and then about 4:00 o'clock in the morning. (R. 623.)

I have some places where I get through my runs quicker than two hours and some places not so quick. I change the water the last thing at night before I go to bed from 10:00 to 11:00 o'clock, and I haven't missed a changing at 4:00 o'clock in the morning more than ten minutes at any time. I irrigate so that it takes me three to four days to get over the 15 acres, and as soon as I finish the last part, I start immediately upon the other part, and I am irrigating continuously. (R. 624.)

There are periods when all of my water but the well goes to my neighbor for his use.

West of Freewater there was quite a little ground not in cultivation when I was a small boy. Some of it has been brought into cultivation since I can remember. There is no increase of acreage in apples in my neighborhood in the last five years. Some apples have been pulled out. (R. 625.)

## RE-DIRECT EXAMINATION

If the water for the trees is short one year that affects the crop for the next year, and if very short it would affect it for several years, although I do not know this for sure. Where the trees have been pulled up most of them are growing tomatoes. Through the gravel belt we are pretty safe on frost. (R. 626.)

I have seen crops killed by frost on good ground when we had a full crop on the rocks. I believe the rocks get warm in the daytime and stay warm half of the night. I have seen frost at the state line on the good ground, but the sun shines in clear weather when frosts come at night, and warms the rocks and they stay warm until midnight. I have picked up the rocks and they are warm. (R. 627.)

## RE-CROSS EXAMINATION

There are plenty of rocks on top of the soil, and I believe that it is these rocks which help with the frost.

When there is moisture in the soil we are a lot more subject to frost. I think the rock warms up the soil rather than the soil cooling the rocks. Keeping the temperature up late in the evening makes the warmth last longer in the morning. (R. 628.)

### *Testimony of Jas A. Fee*

(630 to 635)

Lawyer since 1894. Lived in Walla Walla before 1884. 1880 on. (R. 630.)

Business took him to Walla Walla. Crossed at Ford by McCoy place. First crossed in May or June, 1885. (R. 631.)

Crossed again after the middle of July or middle of August both coming and going from Pendleton. Had been water when I crossed before, but it was dry then.

Crossed several times in dry season of 1885 and 1886. Never saw water there in dry season. Dry in July or

August, 1885, and again in 1886. Helped try Finis case. (R. 632.)

Never down by McCoy place again. When crossed it was right by the house. McCoy and I read law together. Do not know about 1895 to date. (R. 633.)

CROSS-EXAMINATION

McCoy buildings now in substantially same place. (R. 634.)

Came from Walla Walla buildings on left as I crossed the stream; there was open roadway there. (R. 635.)

*Testimony of Warren Roeder*

(636 to 677)

I live 1¼ miles North and a little West of Freewater. I came there in 1913 as Assistant Water Master. L. A. Rieneman was Water Master then; he is now in California. I took up distribution of water on Walla Walla River in Oregon. (R. 636.)

I distributed under Finis Decree (Oregon Ex. 31). Worked as Water Master to 1919, and at all times distributed under decree. I went on in the Spring of 1913, and became familiar with stream system. (R. 637.)

I went on in April but began studying stream in March. There were wooden divides and headgates of different patterns, but no established system. There were holes around and under and cracks in the wooden gates; cracks in weirs so there could be no accurate measurement. That year (1913) the Tum-A-Lum was dry and has been each year since. (R. 638.)

From the point in the Northeast Quarter of Section 26, where the two Crocketts came together to where the springs rise for the East Prong the channel was dry.

From the line between Sections 25, 36, 35, 26, 27 and 34 in 6 North 35, there was practically no channels—1½ feet in places—they would narrow to 1½ feet. Willows, alders,

and brush grew 4 to 20 feet aside from the channels. (R. 639.)

The Ford was the same. The Crockett, the Ford and all channels were dry at the end. We dried up the Tum-A-Lum.

In the summer no water went down either Ford or Crockett to Washington. The men at the ends of channels dammed the streams with dirt and manure so no water went past.

The same condition has existed each year since. (That no water went to Washington in the summer time.) In the winter the water ran to where these channels narrowed and then flooded out on the places. (R. 640.)

The place I bought was a lake each winter and spring because the channels were so small water could not get through. We straightened the channels. They thought brush growth saved evaporation. After we got in divides and "proportioned" water they opened channels and took out brush. Channels were moved to property lines and made from 3 to 4 times as large. (R. 641.)

Even today when it rains we have floods over the tops of these channels. We would have to increase the channels to carry water to Washington. We put in the frog when I first went on before then there was just a plank. The frog is in the Northeast Corner of the Southeast Quarter of the Northeast Quarter of Section 2, 5 S. 35. We put it in with concrete and gates. (R. 642.)

In measuring at the frog we had to allow for seepage. (R. 644.)

The first year we spent two days a week checking seepage and evaporation. The first year we allowed 15 to 25%, and in later years we reduced this to 10 to 15%. In cloudy and rainy weather there is less loss by seepage and evaporation. (R. 645.)

I got in the last main divide the year I left. (R. 645.)

We could only get in 2, 3 or 4 in the Spring, and 1 or 2 in the fall. We put in the Overturf divide in the Fall of

1919. During all my time there it has been a gradual development in distribution and putting in divides. (R. 646.)

At the Red bridge, when I went on we would go up and scrape out and put in a sack dam. When I went in we shut off the water as tight as we could at the Red bridge, and then we supplied whatever the East Side was short by turning it out at the spillway in the Peacock Mill race. (R. 647.)

We took all the water out of the main stream and put it into the Little Walla Walla. After that we turned none down for Washington. If the East Side dam was not proper we turned in no water for them. (R. 648.)

Our system limited the old rights to 1½ inches per acre. They had been using more. (R. 649.)

When I went on they were getting as much water around and under the weirs as through it. There was only one concrete headgate on the system (Stillman) when I went on. I bought my place in 1917 and have farmed there since. I have 15 acres now; had 20 and let my cousin have 5 acres, but I run the 20 acres yet. (R. 650.)

My 15 acres varies from good to extremely bad soil. It is volcanic ash, washed in by the stream, and underlain with gravel. I raise cherries and prunes. (R. 651.)

On the 20 acres there are 14 acres prunes; 6 acres of cherries; (one acre out for buildings and roads); making about 19.3 acres.

Cherry orchard to south 30 x 32 rods divided in center by head ditch and tail ditch. The prune orchard is 46 2/3 x 48 rods divided in center by a tail ditch and head ditch. I turn all the water on upper end of cherries, then pick it up in tail ditch, run it on lower half of cherry orchard in as many ditches as I can, pick it up again and start on the prunes to the tail ditch, pick it up again and run on the lower half of the prunes. (R. 652.)

My land falls 80 feet to the mile. I use no checks; get through as fast as I can. The soil is so porous it requires

rapid flow to get over it. In some places I must seal the ditch to get the water through. (R. 653.)

None of my laterals are over 20 rods long. (R. 653.)

In the cherries (30 feet to square) I have 5 ditches to the square, about 3 feet apart and run 5 or 6 of them at a time. In the cherries on my first run I run 25 laterals 15 rods long; 6 or 7 in the low season in the cherries and 6 or 8 in the prunes (20 rods long). The soil in the prunes carries the water better. (R. 654.)

Takes me one week to get over the place. I do not rotate; could not without enlarging head and tail ditches. When I get through once I start right in and go over it again. (R. 655.)

I have never used the well; it is insurance. Well is 35 feet deep and 150 feet drill hole. 14 feet loose gravel then cement gravel. Loose gravel does not have soil all the way down. (R. 656).

Soil is mixed with dirt from one foot to 1½ feet to 12 feet. The well at the house was sand and gravel. Very porous after 1½ feet and down to 7 feet. In 1933 measured water used on place, and turned measurements over to Water-master. I used over 2 inches from the last of March to the 1st of June. Last of June about 1½ inches. July less than 1½ inches. August 1½ inches. (R. 657.)

I use alfalfa cover crop. I didn't cultivate cherries in 1933, save in Spring. We re-run ditches once or twice in the summer depending how the grass grows. (R. 658.)

I used no fertilizer in 1933. I raised 110 tons of prunes and got a net of $16.55 a ton; this is about a normal crop. I had 12 ton of Bing cherries, 4 tons Royal Anns; and 1½ tons of Black Tartarians. I got two cents per pound on the Annes and Tartarians, and four cents per pound on the Bings. Net returns. Normal crop but low price. (R. 659.)

Cherry price was one-half of the year before, and one-sixth of the price in the two years before that. I think the average for the district would be three-fourths of my return. (R. 660.)

Much of the land lays so they can only pick up water once; I can pick it up three or four times. My system lets me raise crop with 1½ inches. (R. 661.)

If water is cut down as it was in 1931 it reduces the crop; produces more culls and the trees shed; the fruit drops off. (R. 662.)

We had better price on prunes last year. The irrigation system through the valley is now an economic system. There could be more land irrigated at a great expense by lining ditches to stop seepage. (R. 663.)

Such cost would be more than the ranches could stand. The system took time to develop because the ranchers had no money or help. Concrete work has been put in. (R. 664.)

A pipe line was built to cross a stretch where there was 40% seepage loss. If a rancher would not clean his ditch we cut down his water. (R. 665.)

Ranchers irrigating from springs would ask me when irrigation would start. They knew the springs rose after we started to irrigate. The concrete road was put in on the State Highway between Walla Walla and Milton in 1917 or 1918. The road was impassable before that. (R. 666 and 667.)

The water came out on the surface. Tiling was put in and takes the water to the Walla Walla River. Before that the water went into the Big Spring Branch. The tiling through the center of S. W. ¼ of Section 11, T. 6 N. 35, affects the supply of Big Spring Branch. The tile runs from the highway straight north to the river; leaves road at NE¼ of SW¼ and runs 80 rods to the river. Drains land in E½ of SW¼ of Section 11. (R. 668.)

## CROSS-EXAMINATION

My place is on the Ford Branch. I get water from the West Prong of the Ford; it now runs around my place; did run through. (R. 670.)

In studying seepage loss we proportioned at each weir down full length of stream. We used metal strips to adjust. (R. 671.)

We spent two days a week checking weirs. Soil is generally mixed in territory. (R. 672.)

In 1913 as soon as water got short, we called ranchers and stopped off water to the Tum-A-Lum. There were outlets which carried water North in the winter. In 1913 people raise fruit, berries and crops they could get off early because of water not getting down. (R. 673.)

But few tomatoes were grown and nothing that needed heavy irrigation late in season. North of my place, there was no channel to carry water and made my place a lake in winter. Cars got stuck in the road in front of my place. When the spring rains were over the river would carry the water. (R. 674.)

High water in spring usually put bar across mouth of Little Walla Walla and water would run down Tumalum. As soon as they could get in they opened the channel to the Little Walla Walla. In 1913 but little water could get from Ford to the East Little Walla Walla. Channels were changed to provide drainage. (R. 675.)

Spillway used to deliver East Side water is one-half to three-fourths of a mile below red bridge. Now all divides are concrete; frog in concrete. Most headgates are in concrete. This makes system economical. (R. 676.)

*Testimony of Aubrey E. Perry*

(Transcript pages 678 to 701.)

I am an irrigation engineer working for the Central Oregon Irrigation District. I am a registered and licensed engineer since Nov. 8, 1919. (R. 678.)

I was water master (in Umatilla County) Dist. No. 5 covering three counties from April 10, 1918 to December 1, 1928. During all this time I had an assistant in the Walla Walla basin; Roeder 1918 and part 1919; My father then

worked for two years; Victor Hess in 1922 and 1923; Carl Mason then on until I quit. I made frequent trips (once or twice a week) to inspect and direct the distribution of the Walla Walla water. (R. 679.)

The greater share of my work was here. I observed the Tumalum from the Nursery bridge to McCoy bridge. The red bridge is about one mile above the Nursery bridge at divide between Tumalum and Little Walla Walla. Nursery bridge is by the Railroad bridge. (R. 680.)

East Side ditch takes out about 100 feet above the Nursery bridge. The Hudson Bay Tumalum ditch takes out just below the Nursery bridge. Each year that I was watermaster I observed the Tumalum between the Nursery bridge and the McCoy during the dry season. That stretch was dry every summer. (R. 681.)

The surface was entirely dry. The farmers every spring put in a sack dam and took all the water from the Tumalum into the Little Walla Walla. It was carried down the Little Walla Walla to the spillway where enough was turned into the Tumalum to supply the East Side. (R. 682.)

East Side took out 100 yards below spillway. East Side put gravel and sack dam in channel to get water into their ditch. Below East Side dam there was no water in the Tumalum. East Side dam is 200 yards above Nursery bridge. Channel was entirely dry below that point in July and August. (R. 683.)

Under the Finis Decree (X-31) we delivered East Side 1½ inches to the acre. During all the time I was watermaster I administered Decree which is X-31 in this case. (R. 684.)

I studied seepage losses in all the streams while I was watermaster. (R. 685.)

(Testifying from 1918 report) The Ford (all branches included), on down to Schwald's place, two miles from the frog, a total stream length of 4 miles in July, while irrigation was going on and all the water in the stream was being

used for irrigation there was a loss of 32% or 8% to the mile—a main channel loss. (R. 686, 687.)

The Crockett branches run close to the Ford in the same soil and territory. The loss in Crockett's I figured many years; it never varied much; was 20%. (R. 688.)

The average loss was 8% per mile. In June, 1928, 1000 inches were turned down the Tumalum channel. (R. 689.)

I followed it down; it ran 3 or 4 days and never got past one-half mile; never reached the McCoy bridge. (R. 690.)

Once or twice in 1918 or 1919 flash boards were off Hudson Bay dam for a day or two. I observed connecting channel between Ford and Spring branch. (R. 690.)

That channel was dry during irrigation season in the summer. I observed Crocketts and connecting channel to Spring branches below and channel was dry in the summer each year. Above Milton river is in steep narrow canyon; sides and bottom are rock; thin layer of soil and gravel on basaltic rock in bottom. (R. 691.)

Bottom is solid basalt rock. August 3, 1927, checked return water from irrigation in upper river. One and one-half feet seepage thru P. P. & L. dam and we turned two feet more down. This water was all diverted and seeped back into the channel and supplied all the lower users on the upper river. Each user took all he could from the stream. (R. 692.)

Each user dried stream; took water and used it and below him a similar amount was found in the stream. This covered six miles to Milton Power plant and supplied the rights. Very little consumptive use. (R. 693.)

It revived the prunes. Under Finis Decree 1½ inches of water was fixed as duty delivered at the land and I delivered that amount. Ford and Crockett were natural channels and each diversion was from a natural channel. (R. 694.)

Most farmers took water from the stream right on their land. I never turned the water down the Tumalum during any season at the request of Gardena for their use. They

never demanded it. The conditions when we studied losses in the Ford and Crockett were different than in November, there would be more evaporation and seepage. In November there would not be much irrigation. (R. 695.)

CROSS-EXAMINATION

My testimony on Crockett losses covers studies made in all years up to 1928. The total was from 15 to 20%; 8% per mile. (R. 697.)

In the upper stream rock is exposed clear across the stream. (R. 698.)

In the seepage study on the upper river the water was used up when it reached the power plant. (R. 699.)

In that stretch (during very hot weather) the water was used up, but went that far. There was only return water because before we turned the additional amount down there was no water in the channel for 1½ or 2 miles, the 3½ feet was used up over the stretch. (R. 700, 701.)

*Aubrey E. Perry*

(Transcript pages 853 to 861.)

None of the irrigation wells furnish water for land other than that of the owner of the well. All of the pumping operations are for irrigating the over-lying lands owned by the well owners. (R. 854.)

As watermaster I noticed that the Tumalum river was turned dry when the gaging station (No. 212) was between 185 and 200 feet. When that amount of water was at the gauging station, all water flowing in the Walla Walla river was diverted and the Tumalum was dry. That station is about five miles above the Nursery bridge. Not all of the water was diverted into the Little Walla Walla at the divide; some went to the East side ditch and to the Hudson Bay, but the Hudson Bay was taking all the water in the channel at that point. (R. 855.)

I investigated the depth of gravel and soil above hardpan near the stream of the Tumalum river where it runs

dry, by examining wells, and the depth of the piers of the railroad bridge which crosses the Tumalum. This bridge is about 50 feet up-stream from the Nursery bridge. The west pier sets on hardpan, and it is 18 feet to hardpan from the river channel; the east pier has a depth to hardpan of 20 feet. These piers are right on the edge of the bed of the stream. (R. 857.)

The John Clark well, 100 feet north and 100 feet east of the east end of the bridge is 19 feet to hardpan. It is in the NE¼ NE¼ of Sec. 1 Twp. 5 N. R. 35 E.

The H. M. Betts well in the NE¼ NE¼ of Sec. 1, Twp. 5 N. R. 35 E. is 1,000 feet west of the bridge and is 14 feet to hardpan.

The Todd well is 600 feet east of the channel, and the hardpan is 20 feet below the surface. (R. 858.)

The Bostwick well in the NW¼ NE¼ of Sec. 36 Twp. 6 N. R. 35 E. is 1600 feet east of the channel and is 10 feet of loose gravel, then 8 feet of clay to hardpan. The Jerome Hill well in the SW¼ SW¼ of Sec. 25, Twp. 6 N. R. 35 E. is 1600 feet west of the channel and is 15 feet to hardpan.

The N. H. Hayden well, in the SE¼ SW¼ of Sec. 25, Twp. 6 N. R. 35 E, is 600 feet west of the channel and is 10 feet to hardpan. This is above the McCoy bridge and on the west side of the river about one-half mile above the McCoy.

Right opposite the McCoy bridge is the Pete Miller well, 900 feet west of the McCoy bridge on the section line between Sections 24 and 25, Twp. 6, N. R. 35 E., and is 33 feet to hardpan, but sets on a raise just above the channel about 15 or 16 feet. (R. 859.)

## CROSS-EXAMINATION

There was that much water at Station 212 when the water stopped flowing about five miles below the station, and all water from the stream was diverted either at the Little Walla Walla divide or the Hudson Bay intake and the east side. (R. 860.)

My data on the wells were partly obtained through the last year and partly during the time I was watermaster. The Clark well I measured some years ago. (R. 861.)

## RE-DIRECT EXAMINATION

Station 212 is below the forks and would give the combined flow at stations 214 and 216 less diversions above station 212. (R. 861.)

### *Testimony of W. E. O. Criger*

(Transcript pages 702 to 713.)

I am a Civil Engineer; registered and licensed in Oregon; followed the business 23 years. Surveyed Gardena old ditch in 1933. (R. 702.)

Had Or. Ex. 34 and 35 and could determine the line of the old survey. Surveyed the ditch line outlined upon them; checked courses and traversed levels along the whole length. Found old survey stakes along whole length. (R. 703.)

Prepared map. Ex. 37. "End of Water" was the end of live water in the ditch; "End of Ditch" marked end of old construction. "Old Stake" indicates some of old survey stakes found; there were too many to record and they were quite frequent. (R. 704, 706.)

Dotted line west and south of hatch marks shows level to which water could have been taken by the old ditch. Hatch marks show land now irrigated which could not have been irrigated under the old ditch. Map drawn to scale. Small figures in hatch marks are acreage. (R. 707.)

## CROSS-EXAMINATION

Map of gravity flow. (R. 709.)

Gardena is 60 or more feet above nearby water courses. (R. 711.)

## RE-DIRECT

Fall 2½ feet to the mile. Checked ditch above end of water and it carried that fall. (R. 712.)

*Testimony of W. C. Mason*

(Transcript pages 714 to 741.)

I live 2¼ miles north of Freewater. Farming. Deputized on part of Little Walla Walla in 1921. 1923 to date as deputy water master. 1923 to date in complete charge locally of distribution of water on Walla Walla. (R. 714.)

Spencer is now the watermaster in charge; before that Perry was the water master. We usually start regulating the stream in May and June. The years are different, but we start when they begin irrigating generally. First we set weir boards and regulate headgates. (R. 715.)

Have charge of distribution on upper stream. The west bridge is a mile below the joining of the North and South Forks. We make pretty careful adjustments below the West bridge, but although we are subject to call for regulation above the West bridge, we have very few calls. I find that the use of water by the irrigators above the West bridge does not interfere with the general stream system. There is a lag when they first make their diversions, and we have tried to encourage an earlier use so as to not have the lag during the critical period. (R. 716.)

The lag is very noticeable for three or four days after they first divert on the upper stream. I was with Perry in 1927 at the Power Company's plant. Before that the Power Company's flume was leaky and enough water got into the stream for the irrigation, but along in 1926 or 1927 they tightened this flume and checked the leaks. (R. 717.)

In 1927 the tightening of the pipe line prevented the leaks, and there was not enough water. We turned down over the Power Company's dam an additional two-second feet. Each diverter used a manure or dirt filled dam and took all the water they possibly could from the stream, but a great many of them did not have enough water at their property line to take care of their rights. With the two-second feet we turned down there was a total of 3½ second-feet to supply them. (R. 718.)

I checked for springs and found a few small ones with probably a tenth of a second-foot leading in out of some of the canyons. The rest of the water came back within a quarter of a mile of each diverter's dam into the river again. The stones and rock were large along the banks, and the banks were very steep. The ditches were usually close to the stream, and resulted in a heavy percolation back into the stream. About 25% of the amount diverted reached the property line. I judge about 75% returned to the stream. I measured it both at the intake and the property lines whereever possible. I got the water to the Paulsen place, which is the lowest place before I got it to the Jarrard place. (R. 719.)

Below the West bridge and above the intake of the Milton ditch there is a headgate system on the Zell ditch. The Spence ditch has a weir; both have spillways where we can turn the water in the ditch back to the river. (R. 720.)

The Zell ditch had one-eighth of a mile of their ditch washed out entirely, and that condition exists in the Canyon generally. The irrigated tracts are small and the amount diverted is small. We do not require them to install permanent diversion works along there. (R. 721.)

The changing character of the stream and the banks is one reason for that. When the river recedes I go on the upper river, check on the quantity used, and regulate their headgates in that particular section. I usually regulate it at the spillway. On that section of the river it is almost impossible, without an enormus expense, to keep anything that would withstand the river pressure; it would cost more than a small irrigator could invest. (R. 722.)

In June 1927, a freshet came down the river in a twenty-minute period and raised it 1,000 second-feet in twenty minutes. Before that 1,000 feet came down it have been flowing 125 second feet. It was just after the Hudson Bay shut off. Part of that run-off was down by morning, but it was several days before it was all down. It washed out all the dams.

I know the diversion point of the Milton ditch. It takes out in an old channel. The river has been very changeable at that point in the period I have known it. (R. 723.)

It has caused the city a lot of expense and trouble to keep the river from cutting down the southwest bank. The Milton ditch proper starts in at Thorne Street in Milton. Above Thorne Street the water is carried in the old channel and the flume which the ditch company and the irrigators put in. This is about three-quarters of a mile above the Thorne Street gates. But the point at Thorne Street was originally the intake from the stream and the measuring works have been there ever since I have been on duty. The Milton ditch has a headgate at Thorne Street and a pass ditch leading back into the channel. (R. 724.)

The passway empties into the Miller flume. The discharge from the Miller flume is into the Little Walla Walla. All of the surplus water diverted to the Milton ditch and turned out their spillway goes into the Little Walla Walla. Since I have been on the stream I have watched the Ford and Crockett branches. Their water is taken out at the frog. (R. 725.)

We allow between 15% to 20% for seepage loss. In the spring there is not so much loss. When the weirs are put in it increases the loss. (R. 726.)

When diversion dams or weirs are placed in the channel of the stream that reduces the carrying capacity of the channels. We have put in proportionate weirs because of fluctuations in the stream, and it makes the most equitable distribution. They are rectangular, contracted, proportionate weirs. (R. 727.)

Dr. Woodburn made his seepage test upon the Crocketts in November and December. Most of the weirs were then out. I have known the Tumalum since 1901, in the fall. Each year from 1901 down to the present time it has been dry in the summer time. I have crossed the river back and forth every year. I have seen it dry in the middle of May and have seen it run as late as the forepart of July. (R. 728.)

As a rule it stayed dry until the heavy fall rains set in, around the latter part of October, and after irrigation is over with the exception of the Hudson Bay Ditch Company, which practices winter irrigation. In 1933 at the time irrigation stopped, or about that time, I followed the water turned down the Tumalum river to see how far it would go. 19 feet turned down on October 31, 1933; 21 feet on Nov. 1st, and 25 feet on November 2nd only reached between a quarter and a half mile below the Nursery bridge. (R. 729.)

The 240 feet which came down on November 3d reached the state line about 9:30 in the morning; or rather on Thursday morning of November 3d had not reached the McCoy ranch. On Friday morning the river at 9:30 reached the Walla Walla river gauge. On November 3rd, at 9:30 in the morning there was a heavy rain that came and washed out a dam or two above. It took out the Mill Company's dam and 200 and more second-feet went down and cleaned out everything along the river. October 29th and 30th there was 8 second-feet went down, and that did not reach a quarter of a mile. (R. 730.)

Two or three times I saw where someone had torn out the flash boards on the Hudson Bay Company's dam from two to three to five hundred miner's inches would flow down, but no part of this ever reached through the dry stretch. At one time I recall I followed it down when 500 inches were flowing, but the water never got to the irrigators below. In 1928 some water was turned down. I did not follow up this water to see if it went through. I know the channel that connects up the Crockett branches with the East Little Walla Walla. It has always been dry during the irrigating season since 1901 to my personal knowledge with the exception of 1918, which year I am not familiar with. The same is true of the channels which connect the Ford with the springs at the head of the West Little Walla Walla. Whenever we discover waste I cut down the irrigators head of water until they change their system in order not to make a wasteful use. (R. 731, 732.)

I would remedy waste immediately in all cases. We do not attempt to prevent waste when the Tumalum river is full and thousands of inches are running into the Columbia. During the high water time we encourage the use of water without limitation so as to get water into the gravel to feed the wells and springs. We check up on the irrigators throughout the season. (R. 733.)

As a usual thing both myself and the irrigators keep a check as to the amount of water they get. (R. 734.)

A large number of irrigators follow the practice of a limited rotation. When they raise nothing but orchard on the gravel land we can sometimes rotate along 50 to 60 acres; but where they have tomatoes a 20 acre rotation system is the most satisfactory, and is the largest we could put on. They have tried larger, but have been cut to very short periods of running, resulting in injury. The Rogers tract is about an average size in the tomato line in the real gravelly section. (R. 735.)

The rotation as practiced is a reasonable method, under the conditions and circumstances in that particular district. I, personally, lost $200 on a bean crop because of the attempted diversion and rotation with a large number. We are very subject to rises and falls in the streams in May and June. We have drops as high as 25 second-feet in a day, but as a general rule in the last part of June and first of July the sudden rises and falls of the stream comes more in May and June, when the warm winds are blowing and there is hot weather. We get as high as 25 second-feet drop per day. The Hudson Bay priorities are 1903, and its time of shutting off varies from the first part of June until the first part of July. The earliest time was around the 25th of May, in 1926. (R. 736.)

## CROSS-EXAMINATION

The P. P. & L. Co.'s dam diversion point is from 16 to 18 miles above Milton, and is considerably higher than Mil-

ton. The fall in the canyon is somewhere around 80 feet to the mile, and the season up there is a little later. (R. 738.)

The flow into the frog is fairly constant. (R. 741.)

### *W. C. Mason—Direct Examination*

(Pages 1135-1146)

There are approximately 160 rights which we have to divert from the natural channels. In administering water on the Oregon side the time of beginning of measurements is determined by the time the stream falls below the total number of rights. (R. 1135.)

I have a record of placing weirs on the Crockett branch on May 11, 1933, but all weirs were not placed on the Little Walla Walla at that time. That is the period when we started. My notation shows I placed the Crockett weirs then on account of danger of lowering the underboard in places with the heavy stream. The stream was too high to place the full depth of measuring weir at that time. From then on through the season we were administering and measuring water. We used proportional weirs on the different channels and we controlled the flow into the channels by the gates at the frog. The gate at the frog is where we make our adjustments so that exactly enough water goes down to take care of all diverters upon the channel. In making an adjustment on the Crockett branch to cut out priorities, it takes me about a week. (R. 1136.)

It takes at least four days to make an adjustment and cut out priorities on the Ford; three to four days. I don't always check the up-river ditches. We haven't been in the habit of controlling ditches above the Jewel West bridge. Other diversions would take about two days to adjust. If there is a rise in the stream, and if the Hudson Bay ditch priorities had been cut, and I would not have to adjust the entire priorities on the Crockett and Ford branches, it does not take long to take care of the rights—probably a three or four day period. If the Hudson Bay ditch was out it

would take in the neighborhood of nine days to adjust the entire stream. If I turn into a channel more water than is required to supply the decree rights on that channel, the over-diversion is divided proportionately among the users. (R. 1137.)

In other words if there is a surplus over the entire amount they are entitled to, and the surplus runs for a day or two, all users on that channel gets the benefit of some surplus water for that period, for whatever time the surplus ran. (R. 1138.)

During the irrigation season, all of the rights below the gravel fan and below the dry places on the Ford and Crockett branches are supplied from the springs. In the spring months before the headgates are in they get some river water before irrigation is generally started. After we start measuring water according to priorities none of the river water goes through to them. When there is a surplus in the stream, over all rights, we make no measurements to the users. During that period there is usually water running through the entire course of the Walla Walla river to the Columbia. (R. 1138.)

As a matter of administration we cannot differentiate between the soil classes upon the gravel fan and the up-river soils. The soil is so general in character it would take a very minute detailed measurement, and it seems to me would be impractical as far as distribution is concerned. With my knowledge of the territory and my familiarity with the water rights I cannot pick out on the Youngs soil map the areas of soil in each man's holding; that is the different classes of soil in each man's holdings.

We have two power plants—the Milton City power plant and the P. P. & L. Co., and these companies, especially the Milton City have fluctuating needs. Their requirements are not regular and that is one reason why it takes a little longer period to administer. (R. 1139.)

I first have to determine whether I have a head in the stream, and I have set the gates and regulated them. At first I attempted to do that three or four times a day. I found that I was very often injuring some parties, over-supplying some of them by a system of that kind. There were fluctuating heads that were coming down, and while they were not great, they changed the number of second-feet. The Milton City takes water from the main canal at about station 215 on the South Fork and they have an over-flow—one of their tail races feed back into the old city pipe line which supplies water that goes into the Little Walla Walla river. Their main over-flow, however, drops down and runs into the main channel, part of it being picked up by the Milton ditch. This increases the head in the Milton ditch in case of overflow, and increasing the head on the East Side channel or the Tumalum channel, and making necessary a change of all those controls to change that water. I have found from experience that unless there is a continued change, the best method is to leave that control alone, and there is very little damage to any party. However, if I find an over-diversion on the Milton ditch and attempt to control and regulate that at their spill-way, I quite often came back and found it one or two second-feet under-diversion. (R. 1140.)

So there are over-diversions and sometimes small under-diversions, and I find it best to leave them alone on account of it being impracticable to distribute evenly. If there is an over-diversion in the Milton ditch and water runs down past and over it, it is there picked up and used by the Finis Irrigation Company. They irrigate about 107 acres with that waste water right and their well. (R. 1141.)

Mr. Perry, Spencer, and myself made a compilation of the exact acreages irrigated through the West Crockett, the East Crockett, the Stillman ditch, the Ford branches, the East Side ditch, the Powell ditch, the Perkins ditch, and the Tumalum ditch. We checked from the decree and we

also knew who diverted from these branches. We had the old adjudication map, and our record of delivery; also a former compilation we made. We turned the figures over to Mr. Humphrey. I don't know when I started measuring water in 1932; I haven't my data with me. (R. 1142.)

In distributing water through the natural channels, such as the Ford and Crockett, we have a transportation loss of from 15 to 20 per cent. We have arrived at the figure of 20 per cent as a transportation allowance, and it approximates as near as possible the amount that carries the users' rights down to them. I know the East Side ditch. It is a natural channel which has been improved into a ditch. There were two branches and the farmers formed a ditch company, straightened those ditches out some, and formed their ditch company to transport water through the ditches. It is an improved natural channel. (R. 1143.)

In turning water down there we allowed for a transportation loss. The McCoy stock water is taken through the East Side ditch and turned into another ditch for transportation to McCoys. All rights on the East Side ditch are awarded out of Little Stream; the McCoy branch. We allowed a 20 per cent loss on the East Side over approximately a two and a half mile course. The McCoy's are awarded 50 miner's inches at the head of the stream and their carriage is nearer three miles. (R. 1144.)

## MASON—CROSS-EXAMINATION

That was in accordance with the old Finis decree. The Jewel West bridge where we started regulating the stream is about four miles above Milton and in the neighborhood of four and a half miles above the red bridge. In regulating the stream for rights below we use the East Side ditch, the Tumalum ditch, the diversion at the red bridge, then there is Stillman, Perkins, and several other small users along the Little Walla Walla, and the headgates at the frog and the Powell ditch headgate. Then we use diversion weirs and

numerous small weirs up and down the East Crockett branch, the West Crockett branch, and the Ford branches. (R. 1145.)

When there is an increase in the stream and I discover it to be a definite increase, I adjust the headgates and regulate it. If I am undecided about a small three or four second-foot increase I let that go down the stream if the Hudson Bay ditch rights are out. If they are partially filled I check the difference and throw it into the Hudson Bay. Unless I determine that a head of four to five second-feet is not a fluctuation, I merely apportion it ratably among the headgates. If I know there is an increase in the stream I adjust that to the rights. We also regulate the Milton ditch. (R. 1146.)

*Testimony of George Knopf*

(Transcript pages 742 to 746)

I live in Oregon on the state line. In 1933 I measured the water used on my place under the direction of Mr. Humphrey, of the state engineer's office, and sent him the measurements. I measured with a rule. (R. 742.)

I did not calculate the amount of water used, myself. I used the water on three acres of orchard; prunes and apples. My soil is most all gravelly; there are a few spots with surface soil, but gravel below. I have grass; blue grass and some alfalfa—five or six years old—for a cover crop. I use the fertilizer from my chickens; I have no live-stock. (R. 743.)

I raised eight tons of prunes; there was a little less than one acre in prunes; this would be about three-quarters of a normal crop. I raised 300 loose boxes of apples on two acres; all grades combined; one-third were "C" grade and culls. (R. 744.)

I had about one-third crop of apples. I had water for the whole five acres, but used it all on three acres. In 1930

I tried to farm more and had to give it up because the water was not enough to cover it. By using the water for the five acres on the three acres I was able to raise a crop. I do not rotate. (R. 745.)

*Testimony of C. E. Herr*

(Transcript Vol. VI, pages 748 to 760)

I live at Sunnyside, about one and one-half miles north of Freewater and three miles south of the state line, and have lived there 29 years; I have been engaged in fruit raising at all times. (R. 748.)

I have irrigated during all of that time and have a fraction over ten acres. In 1933 six acres of my property and two acres on my father's were taken as one of the test places making eight acres under the measurement. The soil varies from gravelly to very rocky. I raise cherries, apples, prunes, peaches, grapes, plums, and a small garden. (R. 749).

Under the measured part there were close to three acres of cherries; close to three acres of apples; a fraction over one-half acre in prunes; a fraction under one-half acre in peaches and about one-half acre in grapes. I used a cover crop until the last five years, then I tried clean cultivation and I am sorry I did so. I find that when a cover crop is used with clean ditches you can hold the moisture better than with clean cultivation. During the dry part of the season in the latter part of July and August, if I loosen my ground in clean cultivation I am unable to get the water through my ditches. (R. 750.)

With a cover crop it was easy to get the water through at all times. With clean cultivation the lower end of the orchard dries up while the upper end is over-watered. I use barnyard manure; no commercial fertilizer. I produced six tons of cherries off the measured part of my land. This is about 50 per cent of a normal crop. (R. 751.)

I raised 2,186 field boxes of apples; this is about 45 per cent of a normal crop. I raised two tons of prunes on the half acre. The trees are old and were old nine years ago, and will not now produce a full crop. (R. 752.)

Last year I had about a 30 per cent peach crop. I raised probably 150 crates. I raised a ton of grapes which is about 2 per cent of normal. The shortness of the crop was not from lack of water in 1933. Everything was watered about right. I irrigate my trees every six days. If I do not there is an inferior quality of fruit. If I miss one watering and go 12 days I will not get the color on the fruit or the size, and if that is repeated once or twice during your season, you had just as well quit altogether and just keep your trees alive. (R. 753.)

Drouth causes a "drouth spot" or brown spot on the prune penetrating into the flesh. In 1933 those spots occurred upon the gravelly part where it is hard to get the water evenly distributed to the ground. None of these spots appeared where the land had sufficient water. In prior years when it was dry, the spot would occur upon the fruit of trees that failed to get enough water, but would not appear where the trees were properly watered. (R. 754.)

In irrigating shallow rooted crops all small garden stuff, and strawberries, we must water every three days or twice during every week. I could not handle my property if I was to garden it or use shallow rooted berries as a good producing farm. I could not cover my property with the water during the last year often enough for that purpose, and last year was a good water year. I covered it once a week last year; but with the same water it would be impossible to cover it twice a week. Last year I covered my one-half acre of garden twice a week; the balance once every six days. My garden stuff was close to the headgate, and when I started irrigating I put it on the garden, and then would go back and do so again. (R. 755.)

A man that makes a success in garden stuff in the gravel fan must irrigate twice a week. Most of them have quit gardening on that account.

I measured the water to the 8 acre tract. I transmitted the measurements direct to Mr. Mason and Mr. Humphrey. They are entered in a book. (R. 756.)

## CROSS-EXAMINATION

The first two years I had an acre of strawberries, but I haven't had the grit to try it since. I found I couldn't water my tree fruit and keep up any amount of garden stuff or berries; it didn't allow me to cover my property often enough to keep the moisture near the top of the ground. From one to two feet under the ground we have no soil and must keep our moisture on the surface. (R. 757.)

I get my water from the west branch of the Ford. My ditch to the stream is 50 yards long. The ditch runs through good soil until it gets to my land. Generally I have not enough water to irrigate my land during the summer. I don't know what I am going to do this year. In 1933 I got along the best I have in 29 years. I believe that supply of water was sufficient. The reason they measured my tract and part of my father's together was because these two portions are irrigated from the same ditch. My other water comes from a ditch about 35 rods further up-stream and that was not measured. (R. 758.)

We measured only the one source of supply. The prune trees were old 29 years ago when I took the place. They have been profitable during the time I have had the property. If I could afford to replace them I would replace them. (R. 759.)

The brown spot comes on the fruit, not on the trees, and comes close to the time the fruit is ripening. They thought at first that a pest caused it, but have discarded that idea. (R. 760.)

### *Testimony of Mr. Piper*

(Vol. VI, Transcript, pages 761 to 805.)

I live at Lodi, California, and am a geologist for the United States Geological Survey, specializing in the study of ground water. I graduated from Tufts College, and have two graduate degrees from the University of Idaho. My first work on ground water was in 1921. (R. 761.)

That was in the Goose Creek basin in Southern Idaho. I was with the Idaho Bureau of Mines and Geology seven years, until 1926. From one-half to two-thirds of my work while there was on under-ground water problems. In 1926 I went to the Geological Survey and have been assigned at all times to under-ground water problems. I have worked in Pennsylvania, Tennessee, New Mexico, Oregon, Washington, and California under the Geological Survey. (R. 762.)

I investigated ground water in the Walla Walla River basin. It was a cooperative investigation by the Geological Survey, Oregon Agricultural Experiment Station of Umatilla County, Oregon, and the Washington. Department of Conservation and Development. Ex-16 is the report which I made. It includes a map showing the geological appearance of the valley and the map showing the heights of the ground-water table in the valley during the periods of our investigation. (R. 763.)

First the bed rock which underlies the basin is the base upon which the valley is built. The out-croppings of the bed rock are colored green on the map. They extend along the North closing around the West, except a very narrow gap through which the stream escapes. They extend continuously along the South but are not shown completely on the map; lie slightly to the east. In places the bed rock comes to the surface. That rock is folded in the form of a canoe-shaped basin, the deepest part of which is about south of Touchet. There the dense rock is first reached

below sealevel, and several hundred feet below the land surface. (R. 764.)

From there the bed rock rises in all directions so we have sort of a canoe-shaped depression. In that depression the bed rock is covered with various deposits laid down by streams which make the valley proper. The oldest deposit is shown in the report as the Gardena Terrace on the map indicated by the orange color. This formation is shown by the hills and elevations around the valley. The typical expanse is around Gardena, and from that it is given its name. Near Gardena the terrace is 120 feet above the flood plane of the Walla Walla river. It is the high terrace on which a part of the Gardena tracts are located with remnants in the center and along the flanks. Coming eastward the width decreases until opposite Milton it is perhaps 40 feet. Still further east, northward towards Walla Walla, they are even less than the flood-plain, and east of Walla Walla at the Mill Creek valley they come nearly to the level of the flood-plane. At first that terrace covered the entire basin and was a smooth continuous plain. It has two features or fans with the center about the present canyon of the Walla Walla river at Milton and Freewater, and one with its head near the present village of Tracy. These two fans decline westward, merging in a flat, smooth plain which continued across the rest of the basin. The present remnant is so much dissected that it is difficult to say where they merge, but I believe the original junction would be somewhere in the vicinity of the present course of the Walla Walla river about where Yellowhawk joins. (R. 765.)

Mill creek and the Walla Walla have been the major streams contributing to this. The terrace in its upper part is relatively fine stratified material well exposed near the northern headbox of the siphon on the Burlingame ditch at a wasteway. I refer to the siphon crossing Pine Creek valley. After the formation of the Gardena plain,

the streams cut into it and have formed the trenches through which the various streams now flow. (R. 767.)

At the heads of the two fans, the streams almost completely cut away the top of that old terrace and then began to deposit gravel in the valley which they had previously cut. That process has resulted in two formations, one termed "low terrace" in the report and shown on the map in a brownish-yellow color, which extends but little above the plain nowhere more than 20 feet, and commonly five or 10 feet. They are formed of fine material relatively water-tight. The youngest formation is the coarse gravel forming the fans at the mouth of the canyon of the Walla Walla river and Mill creek which extend outward as tongues or fingers perhaps, one along each of the streams much like the pattern of one's hand, and separated by remnants of the high terrace. The gravel fan raises on and over-rides the deepest of the remnants of the high terrace, or Gardena terrace. The flood-plains which continue on down are built of similar material to the gravel fan, but progressively finer. (R. 768.)

We have records of drilled wells included in the report which give the total thickness of material resting on bed rock. Several are in the western part of the basin. They start on the Gardena terrace, go through that, and penetrate a thickness of gravel; also sand and clay. The deepest of these is between 500 and 600 feet to bed rock. The Milton Nursery Co.'s well (551-B-2) is in Sec. 1, 5 N. R. 35 E. It is south of the railroad crossing and just west of the river. The bed rock was 348 feet below the surface. In Tp. 6 N. R. 33, Sec. 8, the well labelled "Q-1" on the map found the bed rock at 175 feet. The Shields Fruit Co.'s well in Sec. 33 6 N. R. 35, marked "M-1" on the map found bed rock at 413 feet. The Milton Nursery Co.'s well is in 6 N. R. 36 E., Sec. 31, and marked "K-1" on the map is on the Gardena terrace and found bed rock at 417 feet. A well in Sec. 34, Tp. 7 N. R. 33 E., marked "K-1" on the

map is a railroad well near Touchet. The bed rock was 357 feet below the surface. (R. 769, 770.)

In the Milton fan, the widest opening between remnants of the Gardena terrace is near the east, and is now occupied by the little Walla Walla. As you go westward from there across the fan the openings become progressively narrow and less well defined. (R. 771.)

Except for scattered boulders there was no gravel deposited on top of the Gardena terrace at Gardena. It is impossible to tell the young gravel from the gravels which may under-lie the Gardena terrace; together the gravels are several hundred feet deep. In studying the ground-water, I used the methods recognized in the Geological Survey. We selected a number of wells, made periodical measurements to ascertain the static level of the ground-water. From these measurements we traced the fluctuations of that level and have tried to relate these to the source and disposal of ground-water. In determining these the grade or slope of the surface of the country is considered only incidental. The levels referred to are the altitude above sea level, and we deal with the form of the water table, not of the ground surface. The land surface from Milton and Freewater north, slopes about 80 feet to the mile; it is steeper close to Milton, and becoming flatter as you go outward to the north and west. A relatively steep grade continues up-river above Milton. (R. 772.)

We tried to select wells representative of the natural range and conditions, and to include both deep and shallow wells in our observations. The observation wells cover the entire district north to Mill creek, and are shown on plate 5, of Exhibit 16. Plate 5 shows the water table at two periods, one on June 20, 1933, the other August 29, 1933. The first period is when the wells within a few miles of Milton stood at their highest points for the season as we observed them. On August 29th they were about at their lowest period; after the peak of June. (R. 774.)

The contour lines are drawn upon the table and the marking "750", etc. is the feet above sea level. There is 50 feet between contour levels. The solid line shows the June 20th period, the dash line shows the August period. The differences in the water table are shown by lines so drawn as to divide the areas in which the water has fallen or risen an equal amount. (R. 775.)

The line crossing the Tum-A-Lum near the southwest corner of Sec. 24, 6 N. 35 E. and running nearly due west separates an uncolored area to the north from the area shaded pink. The differences between the solid contour lines and the dash contour line shows the amount which the contour has moved because of the fall of the ground-water table. The ground-water level is on a grade, similar to a hill of water, and as the table declines the contour line would move apparently up hill. (R. 776.)

Colors are used on the plate to show areas of equal rise and fall. Where the map is not colored, the table fell less than 5 feet during the period. In areas shaded, the lightest tone of pink the water fell more than 5 feet, but less than 10 feet. The next greater density of shading indicates a fall of more than 10 feet, but less than 15 feet; those small areas of the greatest density is where the table declined more than 25 feet. The greatest decline was 28 feet and a fraction. There is no area of more than 30 feet decline. The blue shading shows where the water table rose. The triangular area crossing the state line and across which the east fork of the Walla Walla passes; the small area above the head of Yellowhawk creek and a small area toward the head of the gravel fan near Freewater. In none of these does the water rise as much as 5 feet. (R. 777.)

Where the contour lines are far apart the grade is relatively gentle; when they are close together the grade is steep. The water in the gravel would move or percolate exactly as though it were surface water flowing down hill; in other words, it moves directly down the slope; therefore

it moves at right angles to the contour lines. If the gravel is of even texture, the rate of movement is proportionate to the grade, or inversely proportional to the spacing between contours. (R. 778.)

June 20th the contours of the Milton fan were roughly circular, about an apex in the vicinity of Milton. (R. 779.)

The water was highest in the Tum-A-Lum fork in that district. The water level in wells adjacent to the river would very nearly meet the water surface of the river; and the observation wells near the river rose and fell in a pattern similar to the rise and fall of the stream, and we conclude the ground water rises and falls as the river rises and falls. Their form is roughly conical. The water becoming ground-water high in the fan, could percolate radially outward down that slope over practically the entire width of the fan in a rudely conical form, could pass along the western-most edge of the fan, to the northwest, or nearly northward. (R. 780.)

The slope would be almost symmetrical, both to the west and east sides. (R. 781.)

At a point on the Tum-A-Lum to the north line of Section 36, Tp. 6 N. R. 35, about halfway between the Nursery bridge and the McCoy bridge, between the 900 and 950 foot contour levels, the water leaving the river would be bound by a radii drawn through that point down the two slopes. It would be limited on the west, by the line drawn from the N. W. corner of the fractional S. W. ¼ of the NW¼ of Sec. 14, on the state line to the point designated as the point where the seepage would start. This line would limit on the west the area within which there would be free percolation and roughly includes the drainage basin of the East Little Walla Walla, and extends nearly to the west frog of the Little Walla Walla. (R. 782.)

Water leaving at a point near the Nursery bridge would be limited in similar fashion by a radius drawn at right angles to the contour, intersecting the state line nearly at

the west boundary of Section 15, Tp. 6, R. 35. The radius is along the west fork of the Little Walla Walla. Seepage from the points mentioned does not go south, any more than water would run up hill on the surface; the pressure from the south would prevent that. We based our maps on observations of 115 wells, and I believe that to be a representative number of wells. The form of the table cannot be determined in its ultimate detail but that number of wells should define its form with all adequate refinement. (R. 783.)

The largest number of wells from which pumping is carried on are confined mostly to Sections 25 to 27 inclusive, and Sections 33 to 36, or perhaps 35 inclusive, Tp. 6, N. R. 35, as shown on Exhibit 17. (R. 784.)

The greatest fluctuations of the water table we have observed is in that district, but I wish to make clear that there is not a depression in the sense that there is a cup-shaped hole in the table. There is a continuous northward slope across it. The table rises 50 feet between the two contours. If it declines only half of that amount it is not sufficient to put a depression in it there. It is a steepening of the grade to the south, then a flattening, but nevertheless a continuous northward slope; and beyond that district a steepening again. There is no reservoiring of the water there, and the gradient is not reversed so that water is not drawn back from the north. Its normal direction of motion is not reversed. (R. 785.)

The contour upon August 29th shows a change of grade, but no departure of the general conical shape that persisted before the decline. The grade at that time is considerably flatter between the 900 and 850 foot contour; although the grade is flatter, there is a continuous downward slope across the district so that ground water still moves across it. (R. 786.)

I do not feel justified in a conclusion that the variation of the ground water table at the points where it showed

more than 25 feet decline was caused by pumping, speaking particularly about the highest part of the fan near Milton and Freewater, and extending northward and westward to the 800-foot contour line on plate 5, Exhibit 16. Several of our wells fluctuated as much as 28 feet between June 20th and August 29th. If that were caused entirely or largely by pumping the recovery would wipe out that decline after the pumping stopped, but it does not. Another thing to consider is that at that time of the year those wells do not stand at their lowest. We selected wells in the winter of 1932, in December, and installed float gauges. (R. 787.)

From these we ascertained that the lowest point of the table is not late in August, or late in the period of pumping, but in February and March, a period when there was but little irrigation and no pumping. From that low point in February and March they begun to raise and they lost as the freshet came down the river and reached their highest point not long after the freshet was at its highest point. There is some lag; not much. They declined as the freshet declines and began to drop before pumping started. This is illustrated by the Hayden well, Sec. 25, Tp. 6 N. R. 35 E. on the map "P-1". In that well the table rose as the freshet came down the river, and began to decline immediately the freshet had passed, and after the channel opposite the well was dry it began to fall rapidly and declined a number of feet before any pumping started in the vicinity. (R. 788.)

My information is that the well had fallen 15 feet before pumping started. The same is true in other wells. This is typical of several near the river. I would consider the ground water supply a wave. In some wells the table rises in response to the river, and the spreading of water over crop land near the wells causes a rise; rainfall also does. The water table falls as pumping becomes general and as the river declines. (R. 789.)

The effect of evaporation and heat would be slight; more than one of the agencies causing the table to fluctuate

are active at the same time. Irrigation begins while there is water in the river. At the same time the river was rising and wells were rising with the river, water was spread for irrigation and it is impossible to say what fraction of the total rise is due to the river and what to irrigation. The same is true of the fall. The pumps are turned on as the river declines, the depression of the table, due to pumping begins soon after the water table begins to decline, because the freshet had passed, and as the peak of the wave of the water table had passed, and our data does not justify an estimate of the total fluctuation due to the several causes because they are working concurrently. (R. 790.)

The depressions, or flattening of the water table from pumping, causes the water table to steepen to the south so that it moves northward more rapidly. It does not destroy the general form of the table. (R. 791.)

A slightly greater portion of the total movement would be in the eastern half of the fan; a slightly greater portion. It would tend to cause more flow to the north than to the west—relatively. The model was marked "Oregon-38". (R. 792.)

The model is the same as plate 5, except it is in relief, while the other is plane. Along the higher part of the fan the percolation of the ground water is constricted by the remnants of the Gardena terrace, but in passing outward the alluvial gravel separates two fingers, which passes between the fingers of the Gardena terrace. The gravel is highly permeable but is breaking into tongues separated by relatively impermeable material. The effect is to reduce greatly the area of cross-section in the gravel through which the ground water can move. (R. 793.)

This occurs about 3 miles north and west from Milton. Along the eastern tips of the remnants of the Gardena terrace there are about four miles of width in gravel through which the ground water can percolate, and a mile further out that width is reduced to perhaps one-half of

that. The greatest constriction is toward the west. Those are the least distinct and narrowest of the channels, and have the least of the gravel. At Milton and Freewater the contour shows a general dispersion away from the stream. At the 800 foot contour and lower contours they trend west of north; to the north of the Walla Walla river, but as they cross the river they swerve toward the west and southwest, so that on plate 5 they have a general "V" shape with the point of the "V" beneath the river. The water converges toward the river both from the north and from the south. The contours indicate from the 950 contour to the 800 foot contour a losing stream. (R. 794, 795.)

From the 800 foot contour for a distance it indicates a gaining stream because the table slopes to the stream from both sides. The springs are segregated into three groups; the inner zone contains most of them and is between the 800 foot and the 850 foot contours as shown on plate 5. They are arranged in a zone from half a mile to a mile wide and roughly circular. Beyond that there are fewer springs arranged in an intermediate zone between the 700 and the 750 foot contours, and in the outer zone, between the 600 and 650 foot contour. By far the most of the springs are in the higher, inner zone. That indicates that the surface grade is such as to overtake the water grade, or water table surface. (R. 796.)

My conclusion is that the constrictions caused by the Gardena remnants have been so great that the ground water is not free to percolate beyond that constriction as it was to the south of it, and therefore the constriction acts as a partial dam, forcing some water to the surface so that it breaks out and forms the springs. The McCoy bridge is at the southern edge of the inner zone. (R. 797.)

It is not possible from the data available to show that the form of the water table in any major feature is the result of irrigation or the result of pumping. It is my judgment that the general pattern of the ground water circulation is natural, modified partly—but not to a major extent

—by irrigation and pumping, and we cannot conclude that the pumping distributes the water further to the west. I have received data subsequent to my report (Ex. 15) and down to the present time, but that data does not change the conclusions set forth in my report. I have found nothing in it to modify the major conclusions represented in the report. (R. 798.)

## CROSS-EXAMINATION

The water table is a simple water table condition. The source of supply is the drainage area of the Walla Walla valley. The springs in the area formed three miles north of Freewater to the state line are supplied by ground water. That includes the seepage in the lower Tum-A-Lum. (R. 799.)

There are no static waters in the table. The springs are produced by an intersection of the water table and the surface, and are not the overflow of an underground reservoir. The tapping of the underground stream by wells would be the tapping of a moving supply of water. (R. 800.)

Most of the irrigation wells tap moving waters. (R. 801.)

## RE-DIRECT EXAMINATION

Exhibit 16, figure 4, following page 67, is a profile showing the surface grade and the ground water table. (R. 801.)

It shows the slope of the ground surface, also the slope of the water table at different periods. (R. 802.)

The diagram shows the slope of the table at four periods, going back to August 22, 1932. In December from the 1st to 5th, 1932; in April from the 4th to the 6th, 1933, and June 20, 1933, so as to show the lowest position of the table, and in several steps up to its highest position, which was June 20, 1933. The dash line upon a cross section would be a fair representation of how the depression affects the water table. (R. 803.)

*Arthur M. Piper*

(Transcript pages 835 to 836.)

I am experienced in measuring and estimating the energy input to an electric pumping plant. Where extreme accuracy is necessary the input is measured by tapping special instruments into the line leading into the motor. Ordinarily we determine the energy input by timing with a stop watch the rate at which the disk in the meter rotates; determining the number of revolutions per second. From the manufacturer we have constants for the types that need it, that give the rate of energy input for each revolution of the meterdisk, and from that we compute the rate at the time of observation. That method is quite as accurate as the measurement of the quantity of water. More refinement is not justified or necessary. In recent years I recall two tests that were in error; the meter was not in proper working order. In one, two coils of the meter had burned out and in the other the meter had been tampered with. The effect of both of them was to indicate one-half of the quantity put in. Ordinarily if any thing is wrong with the meter it throws it out so far that it is obvious something is wrong, and the person observing it would discover the error. (R. 835.)

*Testimony of C. J. Karker*

(Transcript pages 805 to 811.)

I live on the highway one and one-half miles north of Freewater and three miles south of the state line, and farm 6½ acres. This was one of the test places in 1933, and under this test 5 9/10 acres were included. The soil is gravelly and rocky. (R. 805.)

I have cherries, apples, pears, peaches, and prunes. One-half acre of cherries; 3½ acres of apples; ¾ acre of prunes, and about a quarter of an acre combined in pears and peaches. This place has had an alfalfa cover crop, but is now ready to change to clean cultivation. (R. 806.)

I used no fertilizer during the test. I raised one and a quarter tons of cherries, but the tract included some young trees. On the larger trees that would be an 80% of normal crop. I raised 2300 field boxes of apples; this is about 85% of a normal crop. (R. 807.)

I raised four tons of prunes which was a normal crop. I had no peaches on account of the season, but I had a normal crop of pears. I measured the water to the land in accordance with instructions given by Mr. Mason and Mr. Humphrey. I measured it correctly and entered the measurements in a book and turned the book over to Mason and Humphrey. It takes a week to irrigate my place. (R. 808.)

I rotate with no one and when I complete one irrigation I immediately start again so that my land is irrigated once each week. If I miss an irrigation it shows in the quality and quantity of the fruit. 1933 was the best water year for several years, but I did not have too much water. I raise Delicious, Winesaps, and Rome Beauty apples. (R. 809.)

A dry year has the effect upon Winesap apples of making a depression in them that turns black and makes the apple a cull. This spot appears along toward the maturity of the apple but does not appear when the apples have plenty of irrigation. I have raised apples for 20 years on this place. My water comes from the East Branch of the Ford. (R. 810.)

CROSS-EXAMINATION

My water may come from the West branch of the West branch of the Crockett. The stream goes through my place and my ditches take out on my place. (R. 811.)

*D. H. Babcock*

(Transcript pages 812 to 821.)

I live one mile west of the highway and one-half mile south of the state line in Oregon. I farm by irrigation and could not farm there without irrigation. My place was one

of the test places in 1933. I made measurements of the water used under instructions from Mr. Mason and Mr. Stricklin. (R. 812.)

I followed the method they gave me, recorded the measurements in a book which I turned over to Mr. Mason. I had 10 acres under the test all taking out from one head-gate. (R. 813.)

I raised apples, prunes and cherries. I had four acres of prunes, which produced 14½ tons, and was about 50% of a normal crop. I produced 700 field boxes of apples, which ran 50% fancy and extra fancy, the balance being "C" grade and culls. Part of the "C" grade and culls went to the dryer. The apple crop was about 35% of normal. I had an acre of cherries which produced 500 pounds. (R. 814.)

This was ¼ of a normal crop. I think that the frost caused this shortage. I had a garden for my home use. In 1933 the water supply was sufficient and the shortage of crops cannot be attributed to lack of water. In 1933 we had a great deal more water than usuanl. Our water supply depends upon whether or not it is a wet or dry year. (R. 815.)

In 1933 we had as much or more water than we generally have. I spring-tooth my place thoroughly and then let alfalfa and weeds grow up and cover the ground. I use barnyard fertilizer on part of the tract, but use no clean cultivation, and never have, although I have watched the results of other people's experiment. In my opinion the cover crop best conserves the moisture in that territory. My runs are 20 rods long, and I try to get over my place in three days and 18 hours. I rotate. (R. 816.)

The schedule allows me three days and 18 hours use of the water, and during that time I get water for approximately 20 acres. I rotate with E. J. Chastain and Mr. Watson. Chastain has 20 acres and Watson has 10. Under

the schedule I get one-half of the total flow part of the time. (R. 817.)

In keeping measurements, I measured only water that went on my place, and went over my weir. Part of the time I am unable to get over my place in 3 days and 18 hours. If I am unable to do so, the shortage of water affects my fruit. It wilts some of it, and some of it falls, especially the prunes, and reduces my yield. (R. 818.)

It also reduces the grade of fruit. This I know from my own experience. My house garden is a short rooted crop, and in my 3 day and 18 hour period I irrigate that twice, but my deep rooted crops just once. There is no surface waste or waste that I can see from my place. (R. 819.)

CROSS-EXAMINATION

I get my water from the west prong of the Little Walla Walla.

I think that 2 acres of my land has a later priority than the balance but cannot say. My land is one-half mile from where my ditch takes out of the west prong. Chastain is above me on the ditch and Watson below me. When Watson and I use the water we use Chastain's water also. Chastain has another ditch. I have a weekly rotation. (R. 820.)

*Charles Eiffert*

(Transcript pages 822-834)

I live on the Oregon side of the state line about a quarter of a mile west of Milton highway, and farm by irrigation, and could not farm without irrigation. I have lived in the vicinity for thirty years, and have owned this place for 16 or 17 years. (R. 822.)

My water comes from the east prong of the Little Walla Walla. My soil is underlaid with gravel. There are 4 acres covered with silt; the rest has rocks and gravel on the top. On the 4 acres the soil varies from small out-croppings of rock to 5 feet in depth. This place was one of the test places

in 1933. Clarence Zacharias — my employe — made the water measurements. (R. 823.)

He made them under the supervision of Mr. Mason and Mr. Humphrey, and I, myself, checked the measurements. I knew the instructions he got and when I watched him he followed those instructions and entered the results correctly in the book furnished for that purpose. I raised approximately 7 acres of prunes; 5 acres of apples; about 2 acres of melons, and one acre of potatoes, and a little more than 1 acre of squash, and raised hay between my rows of trees. (R. 824.)

There are 16 7/10 acres in the measured tract. My prunes were about 65 tons, which is about 85 per cent of normal. It was an off-year for apples and I didn't get anything except on the Rome Beauties; they produced about 500 boxes. I have Winesaps and Delicious trees also. The early apples more or less just bear one year and then rest a year, and in 1933 they were resting. The Rome Beauties bear more or less every year. (R. 825.)

Of the 500 boxes I would consider it from 15 to 20 per cent of a normal crop. My squash produced ten tons which was a good yield. The melons were muskmelons and cantaloupe, and produced around 300 crates, which was practically normal. (R. 826.)

I got 120 sacks of potatoes, which was a short yield because I dug and sold them for early potatoes. One cantaloupe patch was on gravelly rocky land, which brought my yield down some. The squash, muskmelons, and potatoes were on the side where there is silt and dirt. I had no cover crop except that when it became impossible to cultivate, the weeds grew up. I cover one-half of my place each year with barn-yard manure and have for the last several years. In 1933 we had a good water year. (R. 827.)

It was away above the average and the shortage of crops was not due to lack of water, except my cantaloupe patch was not properly watered once. I get over my place in 8

days, or about one week, and rotate with nobody else. My place is 70 rods long and is divided into three divisions so that I have three runs in that length. In the better class of soil my runs are 35 rods long. There was no surface waste from my place. (R. 828.)

I had no drouth spots on prunes in 1933, but in former years when the water has been short there was a black spot that they call a drouth spot. (R. 829.)

It causes the prunes to be culls, but never appears when there is plenty of water. Last year I didn't run my pump at all, but for about a week we had to do extra work and crowd the thing to get by and I ran the pump a short time. I use my well to supplement the supply from the river when that supply gets short. Ordinarily I use the pump for a short while. Last year is the only year I got by without it. (R. 830.)

## CROSS-EXAMINATION

I have used the well every year since I put it in, which was around 1918. The well is 162 feet deep. I deepened it about three or four years ago. It is a dug well for 20 feet and the balance is drilled. Three or four years ago the well was about 50 feet deep, and I drilled it to 165 feet, but it did no good. (R. 831.)

When there is a cool or cloudy stretch of weather the water raises in the well, and when it is hot and dry it lowers the water and changes. A few days cooler weather makes a difference. From June to July the water is highest in my well. It is then from 12 to 14 feet from the surface of the land. The well will not hold a three inch pump and will pump it dry. (R. 832.)

It is about a normal three inch pump, but is belt driven and will not pump as much as though it were electric driven. I do not use it enough to pay me to use electric power. My water comes from the Ingles ditch. It is about 150 rods from where that ditch takes out of the stream to my place. (R. 833.)

*Mr. Bookout*

(Transcript 837 to 841)

My name is Lloyd Bookout. I live near Pleasant View school, 3 miles south of the state line and 2¾ miles west of the Milton-Walla Walla highway. My soil is sandy. I had a plot there that was one of the test places. The water was measured to it under instructions from Mr. Humphrey and Mr. Mason. (R. 837.)

I irrigated around 15 acres from that measured water. I grew oat hay and alfalfa. I used no fertilizer. We fed the hay, but there was approximately 37½ tons. The measurements were made as directed, and recorded in a book and transmitted to Mr. Mason and Mr. Humphrey. They were correctly taken and correctly entered. The amount of water supply was quite a bit better than in former years. (R. 838.)

Although the water was better than it had been for years, we could not irrigate all of the land. Part of the place was new alfalfa, with oats for a cover crop. The balance was old alfalfa. The hay crop was fair. It takes about a week to go over the place. We irrigated every week or ten days. We get our water from the Pleasant View ditch and did not use our well. Our diversion point from the ditch is on our place, but it is about 3½ miles from where the ditch diverts. (R. 839.)

*Clifford B. Harris*

(Transcript pages 841 to 845)

I live one mile south of the state line and a mile west of the highway. I irrigate 9.53 acres. My land and my neighbor's to the south make 13 acres. He is my brother-in-law. (R. 841.)

We measured the water to the land as instructed, made the entries in a book, and reported them correctly. 9/10 of the place is silt without rock, the rest is rocky. On this 13 acres we raised prunes, corn and garden truck. There are 6 acres of prunes on my place, and 4 on my brother-in-law's.

I raised an acre of corn in among young apple trees. I had 47 tons of prunes, and my brother-in-law had 30 tons. The crop was slightly under normal, about 85 per cent. The corn produced from 60 to 75 bushels to the acre last year; this is about 50 per cent crop. During the dry season we rotate between the two places, but normally we do not. The water for the 13 acres is used by both of us at the same time. It takes a month to cover the place. (R. 843.)

Once a month I irrigate each part of my land. (R. 844.)

CROSS-EXAMINATION

My water comes from the west prong, and my take-out is about 400 feet from my land.

RE-DIRECT EXAMINATION

My land varies in depth from two to four feet with some spots where rocks come to the surface. Underneath the soil is a mixture of gravel and sand with very little soil in it.

I water my prunes once a month. My soil does not take water as fast as the rocky soil. It retains the moisture better than the rocky soil. (R. 845.)

*W. H. P. Herman*

(Transcript pages 846 to 851)

I live two miles northwest of Freewater and three miles south of the state line. A mile east of the state highway and on the east side of the river. I irrigate through the East-side ditch, and have 30 acres, but on the test place there was only 19½ acres. (R. 846.)

I made the measurements under the instructions of Mr. Humphrey and Mr. Mason and recorded and reported them correctly. I raise cherries, apples, prunes, peaches, grapes, and garden. There are about 120 cherry trees that are just bearing. This year we will have a fair crop, but up to now they have been too young to amount to much. We have 120 bearing apple trees and over 100 young trees. (R. 847.)

My prunes are scattered about over the place with apples in between. A fair estimate would be about 13 acres.

I have no peaches except a tree or two for our home use. Last year there was but a few hundred pounds of cherries; the weather interfered with them to some extent and it was a young tree crop. I took off 67 tons of prunes, which is about 80 per cent of normal. I got 200 boxes of apples from 120 trees, which is about 15 to 20 per cent of a crop. (R. 848.)

The shortage was not due to lack of water. It was an off year for the trees. I use a cover crop; alfalfa in some of the apples, and just weeds and grass in the prunes. The last year or two I have used no fertilizer. My runs vary from 15 to 40 rods. I get over the place in less than a week, and immediately start right over again. Last year some of the prunes dropped because of not getting back in time. With shallow rooted crops you must get over them twice as often as fruit trees. (R. 849.)

In the summer when it gets dry I do not raise short-rooted crops. I don't plan to have anything in my garden that requires water through the summer because the water supply would not take care of it. I plant my place to crops that the water supply will handle. If any further cut was made in the water supply I would have to let some of my orchard go. I could not grow anything without irrigation. (R. 850.)

CROSS-EXAMINATION

(Transcript page 851)

The East-side ditch is on my property line. (R. 851.)

*Mr. Humphrey*

(Transcript pages 862-884)

I live at Salem. I am assistant to the state engineer of Oregon and have been since 1922. My work is hydrographing, map work, duty of water work, and use of water investigations, and has covered various stream systems in the state of Oregon. In several adjudications I gathered the hydrographic data for the adjudication. (R. 862.)

I was in charge for Oregon of gathering the data in this case. I also prepared maps and did plane-table-work in the various adjudications. I made the plane-table-survey of the irrigated areas on the Gardena ditch. (R. 863.)

This was made in the fall of 1933. Oregon Exhibit "40" is the map I prepared and correctly shows the irrigated area in 1933. The figures in each 40 acre sub-division show the area irrigated in that 40. Cross-hatching in one direction indicates land irrigated in 1933; the cross-hatching in the opposite direction shows lands which had apparently previously been irrigated. (R. 864.)

These were not irrigated in 1933. There was a total of 5,251.25 acres irrigated in 1933. (R. 865.)

I prepared the graphs which are Oregon Exhibit "41". The graphs are based upon the information in the data book. (R. 866.)

My studies reveal that there is a direct relation between the rise and fall of Mill creek and the Walla Walla river. (R. 867.)

(Exhibit "41" was not offered because it included estimates.) The records of 1914, 1915, and 1916 of Mill creek and the South fork show a distinct and evident relation between the flow of the two streams. (R. 868.)

Exhibit No. "42" covers the use of water from wells. The studies upon which this exhibit is based extended through June, July, August and September. (R. 869.)

Describes the table covering the test places. In selecting test places we tried to select ranches farmed by good farmers with their delivery system in good condition. Not the very best, but in general good, and distributed over the area so as to have a fair representation of the use of water in that district. 1933 was a year of plentiful water supply, the best for a number of years, owing to the way the water came out of the mountains it was available at the proper time. (R. 871, 873.)

We tried to give these test places what we considered a proper supply of water for the irrigation of that partic-

ular land. The fifth page of the exhibit shows the delivery of water to Gardena in 1933. (R. 874.)

It is based on the record in the base date exhibit "18" and the compilation of the application of water to the acreage is based on the number of acres my survey showed. I allowed 12.7 per cent for canal loss. This allowance is based upon several measurements made by myself on the canal in 1932, and considering the character of the canal it probably would not change greatly so that the transportation loss would be about the same for 1933. (R. 875.)

The volumes of water in the canal were about the same in 1932 and 1933. The estimate of miner inch application per acre is based on the Oregon miner's inch, or 1/40 of a second foot. As to the use of water from the wells, we selected a number that were considered representative and had representative equipment, which we tested for efficiency, and then referred to the power bill paid by the owner to get the approximate amount of water pumped from the well. Next to the last column shows the power bill for the year. (R. 876.)

The tests for efficiency of the pumping equipment were not all made on one date, and most of these tests were made by Mr. Robinson and Mr. Mason. Robinson worked in there with Mr. Piper. On page 79 I worked up the material, most of which is in Mr. Pipers report. (R. 878.)

The total amount of money expended for power for pumping for irrigation to the Pacific Power and Light Company for 1932 was $11,789.32; to the Milton City Power Company for 1931 it was $3,710.47. There would not be much difference between the years 1931 and 1932. These two places were the only sources of power for operation of wells by electric energy. (R. 880.)

The figures include only the power consumption; no house consumption for lights or house-hold appliances are included. (R. 881.)

## CROSS-EXAMINATION

I am not acquainted with the rates charged by the Pacific Power and Light Company. The bookkeeper gave me these figures. The amount of water used is for the time covered. (R. 881.)

(There was some cross-examination as to the tables, but Mr. Cunningham said that he had misunderstood the tabulation and asked for more time.) (R. 882.)

## CROSS-EXAMINATION (By Tim Paul)

Q. It is probably true that land between plantings with alfalfa, wheat or barley would not show indications it was irrigated? (R. 883.)

But I will make that plainer Mr. Paul. Before I made that survey I asked Hartvedt if he would recommend some man he thought would be competent to help me, and who would be familiar with the project and he recommended Charles C. Hanning who had lived on the project a number of years and worked on the delivery system for several seasons and was quite familiar with the project and was of considerable help in making determinations you spoke of. In cases where visible evidence as to the status of the land was lacking, I took Mr. Hanning's statement as to whether it had to his knowledge been irrigated or not. If it had, I put it down as having been irrigated, even though it might have looked as though it had never had water on it. (R. 884.)

## CROSS-EXAMINATION—886-894

Exhibit "42" with the exception of the pages entitled: "1932 Use of Water From Wells and Pumping Equipment Efficiency Data", refers to the test places. With the further exception of the tables showing the principal delivery to Gardena. The column headed: "Soil Class" on page one, was taken from the classification set out in Young's map, Washington's Exhibit 15. In measuring the water to the test places we measured the head on the weir. The land owner used a rule or scale. (R. 888.)

I was there twice during the season, myself, to instruct the land owner, and in the remainder of the season the measurements were taken by the land owner under the supervision of Mr. Mason. I could not say the average of errors there might be, because the errors might be in either direction. I would say it would not exceed 2 or 3 per cent. With small heads there is a possibility of greater error. I believe the 2 or 3 per cent margin is very low. (R. 890.)

The acreage was determined by reference to the adjudication map, and in case of doubt I chained the tract. The correct acreage would be the acreage as shown in the table. I have no way of knowing that the land owner used the water on the limited acreage set out in my table. (R. 891.)

Referring to the tabulation, the test places may be found in the Oregon Decree as follows:

Charles Eiffert ..... 116
Knopf (John Gunn) ..... 130
Herman (place) ..... 138
Herr (place) ..... 139
Karker (place) ..... 149, and 109 under the name of "Corkery". The Babcock and Harris places take water from the west prong, and the Bookout from Pleasant View. (R. 892.)

## RE-DIRECT—893

### *Ed. K. Humphrey—Re-direct*
### (1157-1170)

I received the acreage figures compiled by Spencer, Perry and Mason and compared them with tabulation No. 4 —Washington's Exhibit 30. Referring to Oregon's Exhibit—44, the first column "Acres" are the acreages turned over to me by the men I mention, as a result of their compilations and check. The first column is the names of the ditches. These correspond with the lower one-half of Doctor Woodburn's tabulation No. 4. (R. 1157, 1158.)

The second column, or the one to the right of that, headed acres, is the amount of "water decreed at the user's weir," which is the point of diversion from the channel. On the Milton ditch and the Perkins ditch there is a special duty provided by the decree for the small acreages of one and a half miner's inch of water for a tract of land over one-half acre and not over a full acre, and a full inch of water where the entire tract is under one-half acre. (R. 1159.)

In my tabulation I included that special allowance. The next compilation of 20 per cent transportation loss listed for the West Crockett, the East Crockett, the Ford, and the East Side ditches is the transportation loss for a natural channel.

The column headed "Total Necessary at Measuring Point to Deliver Decreed Amount," includes the transportation loss and the decreed amount. All quantities in the tabulation are expressed in second feet.

The column headed "July Mean Diversion," is the mean diversion that Dr. Woodburn used. The two columns—one headed "Under-Diversion," and the other "Over-Diversion," is the difference between the amount necessary to deliver the right and the mean diversion. The same thing is true for the heading under the month of "August". (R. 1160.)

I made those computations myself, and as a result of the computation in the month of July there is an over-diversion of .81 second feet only. In August there is a net under-diversion of 4.5 second feet. If there is an excess of water in the Milton ditch so that it runs out at the tail of the ditch, that irrigates the Finis ditch lands, approximately 107.5 acres, and that is the note I have placed on the bottom of the compilation. (R. 1161.)

I have worked for the state engineer's office on several different projects. I was investigating use of water and methods of use upon those places. Upon this particular project, in investigating for the original adjudication, I was working while irrigation was on, and during the time

water was short. I was mapping and going over the territory, including the irrigated district on the gravel fan, and pretty much all over the area. I had a chance to see and observe the methods and use of water practiced by the farmers. (R. 1163.)

At that time I saw no evidence of waste in the use of water. In connection with my investigation and study for this case. I had occasion to investigate diversion works and measuring devices. I have personally gone over the system. I believe that the diversion works and measuring devices here are a little better on the average than those in other districts where conditions are at all similar. During all of the time I have worked in there I have seen no evidence of any substantial waste. There have been instances of slight waste, but very, very slight. I made investigations as to duty of water on the Oregon side of the line, and particularly upon the gravel land. Where the inch and a half duty was allowed upon the gravel land I saw no evidence that they were getting too much water. I did not make a detailed study of the deliveries upon the spring branches, the East Prong, Big Spring, and Lewis Spring branches, but from observation and comparison, and my observation of the records I do not believe they are getting one and a half inches on these branches or that they were when I was through there. My conclusion as a result of my studies is that the required duty of water upon the gravel land is an inch and a half per acre. As to the lands upon the spring branches the East and West prongs below the gravel fan, those are different textured soils down there and from my experience should have probably from an inch to almost an inch and a half.

I have gone over Young's soil map in evidence as Washington's exhibit No. 15. (R. 1164, 1165.)

I have attempted to ascertain the areas of the different classes of soils. I have examined it to ascertain whether I could take that soil map and the Oregon decrees and from them determine the particular kinds or quantity of the

particular kinds of soil upon the holdings of the various individuals, and I believe it would be an impossibility. (R. 1166.)

HUMPHREY—CROSS-EXAMINATION

In speaking of the duty of water from surface indications I came to the conclusion that they were using all of the water they were diverting, and there was no apparent waste. On Oregon Exhibit—44 under the word "channel" the names cover partly streams and partly ditches; the Stillman, the Milton, the Powell, the Perkins, and the Tum-A-Lum are ditches. (R. 1166.)

I can't say how much of the East Side ditch is part of a natural channel. It is a natural channel that has been straightened and improved. If it has been extended I can't say to what extent. It is near the main stream. For practical purposes it cannot be considered a ditch. It is a stream that has in the past been known as "Little Stream" and is a natural channel. I believe that would make a difference in the measuring points. Any diversion out of "Little Stream" are diversions out of the natural stream, and the decreed amount of water should be delivered at that point to the user. We do not apply the same rule to ditches.

The West Crockett, the East Crockett, the Ford, the East Side ditch, the McCoy stock ditch—which is an addition to the East Side ditch—are all natural streams and the measuring points on them are the points of diversion for each individual landowner. (R. 1167.)

The others are constructed ditches and their measuring point is at the most convenient location near the diversion point. (R. 1168.)

HUMPHREY—RE-DIRECT

The Tum-A-Lum as referred to in Exhibit means the Tum-A-Lum ditch and not the Tum-A-Lum river. The Tum-A-Lum ditch is a small ditch which takes out of the Tum-A-Lum river near the East Side diversion and on the opposite side of the river a short distance above the East Side. (R. 1169.)

## HUMPHREY—ANSWERING QUESTIONS FROM THE MASTER—1169

I am familiar with the lands colored orange on Exhibit 15 upon the fan of Mill creek. They do not compare at all as to occupation and cultivation with the fan at the mouth of the Walla Walla. There is quite a percentage of them not cultivated or occupied at all, as compared with the intense cultivation and orchards on the gravel fan of the Walla Walla. The occupancy is entirely different. I am not so familiar with the lands colored orange to the west on Exhibit 15. I can't say exactly as to them, but they are more nearly comparable to the gravel fan on the Walla Walla than the gravel lands up Mill Creek. (R. 1169.)

## FURTHER QUESTIONING BY MR. RANDALL

The second orange belt referred to is largely within the city of Walla Walla; it is difficult to tell from this map; the boundaries of the city are not marked definitely, but I would say that most of that lies within the city of Walla Walla. (R. 1170.)

### *Powers—Direct Examination*

### (Transcript pages 1002 to 1036)

My name is Wilbur L. Powers. I reside at Corvallis, Oregon, and have for 25 years. I am soil scientist and have charge of the soil department at the State College of Oregon at both the college and the station. I have had 27 years experience with soil, soil classification, and water requirement work for irrigation practice and experimental work. I am a B. S. and an M. S. in agriculture. (R. 1002.)

Most of my undergraduate work was at the University of Illinois, but the degrees were from the New Mexico Agricultural College. With reference to soil matters I have traveled in ten foreign countries, a good part of the time in Russia and in the Northern European countries. I have supervised for the state the cooperative detailed soil survey

work for 15 years. I have carried on investigations as to water requirements in many places in the state. Irrigation and drainage investigation has been included in the soil work all these years. (R. 1003.)

I have classified land a great deal for the Federal Reclamation Bureau and have classified several projects in Washington. I worked with Johnston on the Sunnyside division of the Yakima project and wrote a reviewer's report. The Reclamation Bureau called me in for that work. I have been employed by the Reclamation Bureau as consulting irrigation economist and consulting reclamation economist in a number of their projects. I have examined soils in and around Milton and Freewater and the Walla Walla valley generally. The soil in the basin is derived from basaltic material; some recent, some fairly mature, largely water-laid, but wind-laid in part, and where more mature the profile development is the result of climate and the vegetation it brings in. (R. 1004.)

There is a zoning from the gray desert soils at the lower end of the project, then a zone of light brown semi-arid soils including the loess of the benches, then a zone of brown soil and black earth, and finally leached coniferous soil near the forest. Interspersed with that there are areas of meadow soil affected by waters and areas that have become alkaline. The organic matter in the native state is related to the amount of moisture supply, and salt distribution is related to the drainage. There is more of a leaching out in the upper coarser areas and accumulations so as is general there is more alkali as you go down stream. My first visit to this area was about 1914, and I have been in here at times since then to study the irrigation situation, but more intensively during the last year or two. (R. 1005.)

As to the soil map, when the request came for the map we were engaged in a detailed soils survey in cooperation with the U. S. Bureau of Chemistry and Soils, and I requested of the chief, Dr. Marbut, permission to use the

field sheets as a base for a soil map. The soil survey we were then engaged in was in Umatilla County, including the Milton and Freewater districts. We photographed up the soil map as far as it was finished, which was only from about Freewater to the State line, and from the bluffs east of the river, west to Umapine. In photographing up the paper shrinks a little, and any errors are magnified a bit in photographing it up to approximately a two-inch scale. The detailed soil survey work was a one-inch scale, and is regarded as accurate down to about ten acres. We then found that there was further territory involved and covered the territory shown by adjudication maps west of Umapine. And later on the area above Milton was added. (R. 1006.)

First we requested Youngs and Professor E. F. Torgerson to make an irrigability classification. Later I came to the field and we worked that over to a water requirement classification. The detail is not sufficient so that you could correctly estimate the number of acres of any particular class of soil for any individual tract. I wouldn't undertake it. I have referred to the great climatic soil groups. These are divided into subgroups into series comparable somewhat to breeds of livestock. Then the unit of soil classification is the soil type. Based on the series name and its characteristic, and also the texture of class and independent of the soil series, we may place all the soils of one textural class in one group and speak of the "textural class". (R. 1007.)

To some extent that is what is done in an attempt to group soil survey types into water requirement groups. We inherited the six groups Youngs has used by starting out with the six groups defined in the Reclamation Bureau's Fact Finder's Law of 1926, which we used a great deal in classification. That is what these groups are based on to an extent; class 6 is eliminated land; class 5 is normally temporary eliminations; class 4 is water-logged lands in the Fact Finder's definitions. (R. 1008.)

Organic matter is very important from the standpoint of water capacity and important in determining the soil's nutrient supplying power. In Frank Eiffert's class B lands we found 6 per cent organic matter, and in some of the bench lands it ran two or three per cent. There is a class which Youngs put in as class 4 and 1-D which generally covers greasewood and salt grass lands. With the aging of the soil the soluble materials move down stream or are drawn to the surface. On higher low terrace they may accumulate in the subsoil and cause it to cement and develop a hardpan, an alkali hardpan. The hard greasewood lands are low terraced lands in class 5; it is hummocky, alkaline, of doubtful economical value. The salt grass land has more surface water I think and more sub-irrigation; it is more affected by water and perhaps darker in the native condition. (R. 1009.)

In the upper reaches of the stream where it occurs it has been laundered out to some extent so there is present some native clover, some blue grass and other of the more palatable grasses. In the lower country, below the vicinity of the Whitman homestead, the class 4 land shown in the soil map is largely idle, or nearly so. Hard greasewood land, some salt grass—but greasewood prevailing—as you go down stream. Some of that land has been fitted for irrigation, and part of it has gone back to greasewood. We made some mechanical analysis and some estimate of the amount of gravel in the No. 3 lands. In the Miller orchard a quarter of a mile west of the McCoy bridge we found that six inch cubes yielded on a quarter mesh screen from 63 to 79 per cent of gravel, cobbles, and stone. First a cube was taken six inches down, then a second six inch layer, then a third, and it ran from 63 to 68 to 79 per cent retained on the quarter mesh screen. This land is in the southwest quarter of the southeast quarter of section 24, township 6 north, range 35. On the H. F. Eiffert ranch in the southwest quarter of the northwest quarter of section 14,

Tp. 6 north Range 35 East, I made a test. That was class 2-B land. Where we tested it was 16 and 14 per cent gravel. That is the next grade to the No. 3 land. On Warren Roeder's land in the northwest quarter of the northwest quarter of section 36 township 6 North range 35 East, one area showed an average gravel content of 49 per cent; another area showed average gravel and stone content of 66 per cent, and then very fine earth. That was in the first six inches. The tendency would be to coarser gravel rapidly increasing with the depth. (R. 1010, 1011.)

The fine material that went through the sieve in this land was 52 per cent sand, and that did not include the very fine sand that went with the silt and clay, so it could not be loam; it would be a sandy loam soil. On the Sunnyside project in the class 4 lands, by mechanical analysis we found the fine soil to be 57 per cent sand and clay. That would make it a silty clay loam, and would have a greater water holding capacity than where it was from 49 to 66 per cent gravel. I made tests to ascertain the excess point and wilting point of the No. 3 lands. In doing so I made a correction for it according to the percentage of gravel. If there was two-thirds gravel and wilted at nine per cent, the fine earth would be one-third of it and we would estimate the wilting point at three per cent. You can only determine the wilting point on the fine earth in cans in the greenhouse. The only practical way to determine the wilting point is to take the fine material going through the mesh and determine the residual moisture. That fine earth gave gravel around seven per cent for the coarse class 3 material. We made excess-point determinations by sampling a day or two after irrigation of the fields in the main classes; also by moisture equivalent determinations which approximate the proper excess point. A field sample may be a little too high. Usuable water capacity would include moisture stored in the soil between the point of permanent wilting or just above it as the lower limit, and the moisture

equivalent approximating the higher field moisture contents that you would find by the time the soil was dry enough to mulch or seed; you then have had the water present long enough to be in equilibrium with the soluble material in a solid phase, so it would really be of nutrient value to the plant. (R. 1012, 1013.)

A great many determinations have been made of usuable water capacity for different classes of soil. For fine sand they would establish about one inch. A medium coarse sand at the Umatilla station runs two-thirds inch usuable water, but it is similar at six feet or more depth there. It is only the heavier soils that will hold more than two and a half inches in a foot usuable water. I once prepared a graphic illustration of that capacity in a bulletin in soil science. On the graph—exhibit 43—the heaviest lines are marked to indicate the wilting point, and on the other end the moisture-equivalent or excess point. The spread between indicates the inches of usuable water for different classes of soil. The "optimum point" is a range. In making the tests it is necessary to have the weight per cubic foot in order to convert the moisture percentage into acre inches. If the soil weighs 80 pounds per cubic foot and you have ten per cent usuable water between the wilting and the excess point, that is 8 pounds of water. To convert it to inches depth on the surface per cubic foot (or per acre foot) it is necessary then to divide by the weight of an inch foot, or 5.2 pounds, an inch foot being one inch deep over one square foot. (R. 1014, 1015.)

In my examination of the soil the ordinary depth of usuable soil in No. 3 lands of the Milton fan shows the most storage capacity in the first two feet and the first three feet, and in this class 3 (Stony-gravelly land) it is on the order of two or two and a half inches. The Bureau designates gravel from two millimeters to three inches in diameter, and cobbles from three to five inches, and above that, stone. The useful soil depth is largely within the first two

feet, but there is some value in the third foot. For a good growth rate we should have usuable moisture in the bulk or major part of the feeding root zone. As to vegetables, small berries, the active feeding root zone is less than two feet; maybe one and one-half feet. The trees which had been pulled out indicated the feeding root zone to be largely in the first two or two and a half feet. The roots are stubby and spread out close to the surface. I presume the lack of moisture in the cobble stones underneath limited the root development. Apparently they are securing their moisture in the surface two feet or so. In our study of pear orchards in southern Oregon it showed that 68 per cent of the pear roots are in the top two feet of soil. They have extracted 62 per cent of the moisture from the first two feet, and 84 per cent from the first three feet. Studies in Orange county, California, showed that 50 per cent of the moisture is taken from the first two feet with citrus trees. The soils around Milton have rapid drainage. (R. 1016, 1017.)

Going down stream to the low-terraced lands we find imperfect drainage. Here you find the salt grass and greasewood developing, and find salinity and alkalinity and alkali-tolerant growths. The greatest area of salt concentration is, as usual, down stream. The reaction value of pure water is 7.0; lime water or highly calcareous soil may be as much as 8.5; alfalfa will be affected at about 8.6 or 8.8. Salt-grass lands here locally commonly run 9 to 9.6; and greasewood land commonly 9.5 and higher. We eliminated in feasibility surveys land with a reaction value above 9 or nine and a half. Good authorities consider there should be 10 or 15 per cent deep percolation to avoid accumulation of toxic salts. (R. 1018.)

It would be in the order of safety to have a moderate amount of drainage and a sufficient application of water on the surface to procure it. (R. 1019.)

There have been orchard fertilizer experiments at Miller's and at Eifferts. They had apparently been picked

as fairly representative and had some accurate data as to yields and response to different fertilizers. The prunes there responded not only to nitrates but to complete fertilizer, which shows that potash is a factor. The irrigation requirements would be different in different classes of soils. Generally the coarser the soil the greater the requirement. I made something of a study of the requirement of water to be applied at one irrigation on the No. 3 lands. It would be difficult to apply less than a five-inch irrigation, and perhaps two and a half to three inches of it might be retained; that is an acre inch or depth on the surface. (R. 1020.)

I refer to acre inches to an acre. Assuming the application of five acre inches to get over the number 3 lands on a continuous flow for the critical months, it would require an inch and a half miner's inches to the acre. The most important factors in my consideration are the usuable water capacity of the soil and the time between the soaking of your land and when the crop shows a tendency to wilt. It is better to irrigate a little before the wilting point when the soil moisture films are still thick enough that they are not too lightly held by the soil at what has been called the lent-point where a plant tends to be slowed up in its growth before actually wilting. We have found much better results where we maintain a good moisture content than to allow the trees to wilt at each irrigation. This is particularly true in cooperative irrigation investigations at Medford. (R. 1021.)

At Medford one block of pears was allowed to reach permanent wilting percentage and then was irrigated; another was given frequent irrigation through the season. With frequent irrigation there were 1034 pears per tree as against 731 where the moisture dropped to the wilting percentage, and the volume of the pears was 180 cubic centimeters with frequent irrigation, as compared to 143 where the trees were allowed to wilt. With frequent irriga-

tion they were 30 per cent larger and there were three times as many 120's, which is the larger size pack of pears. And the tree growth was 40 per cent better the following July as to the length of new growth and the diameter was 30 per cent more. Frequent irrigation gave the larger pears and that is the experience in other places where it is carried on. (R. 1022.)

The last 40 days before harvest is especially important in getting size and yield, and that is true and has been reported in several other state investigations. Batcheller, in Utah Bulletin 142, found that on gravelly soil peaches must be irrigated every seven or eight days, and he obtained more twig growth and a higher color by late irrigation.

Viehmeier, in California Circular 50, reports no injury from later irrigation, but that both leaves and fruit are affected when the moisture is allowed to drop to the wilting point. The trees then grew more slowly.

Abell, in Utah Bulletin, 202, states that allowing trees to suffer for water is an invitation to winter injury. A shortage of water seems to make the trees more susceptible to disease. In this valley the red spider does more damage where trees are on dry and dusty soil. (R. 1023.)

I have observed the water supply in this district and the whole northwest over a period of years. We have had a period of dry years according to hydrographic records. Numerous streams have gone dry, and lakes in central Oregon have gone dry—Silver Lake was half a township or so in 1915, and the bed of it has been dry recently. I think there has been a general decrease in the water supply. A decrease in the yield of alfalfa on the Gardena project from the time it was started is in line with the general experience. We encountered that condition on the Sunnyside project. (R. 1024.)

There are a great many reasons that are known, and some unknown reasons. (R. 1025.)

APRIL 30, 1934

*Powers—Direct Examination*

(Pages 1127 to 1134)

I was in the Bureau of Chemistry and Soils in Washington, D. C., on leave during the winter of 1930-1931 doing research work on soil colloids. I took my doctor's degree at California, studying there in 1923 and 1924. (R. 1127.)

While there I studied plant nutrition and soil. I finished my thesis after my return and got my doctor's degree in 1926. The colloid fraction of the soil includes the very fine particles both inorganic and organic. We can say clay jelly, peat jelly, or humid jelly. It increases with the fineness of the soil. Normally there is much more in the heavier soils that are higher in clay content. (R. 1128.)

I have found my old field book for Sunnyside. On Saturday, September 19, 1931, Johnston and I were in Section 31—9 north—24 East in the gravelly basalt area. I have notes from 15 test pits that we dug. On a type sample for basalt gravel land near the West quarter corner of Section 31 the profile description read naught to nine inches brown, fine sandy loam, but we were mistaken; when a mechanical analysis was made the soil proved to be finer than our field estimate. There was 57 per cent of silt and clay so that the difference really was a heavy loam, or light silty clay loam. The topography there was smooth. The ten to eighteen inch layer was brown, heavy, and compact, showing some maturity and good development. B-layer or zone of accumulation in the sub-soil was estimated to be from twenty to thirty per cent basaltic gravel, and from eighteen to twenty-seven inches was similar material with a little increase in size and percentage of gravel. (R. 1129.)

A soil to be sandy loam must contain from fifty to eighty per cent of sands. Over eighty per cent sand and less than fifty per cent would be a loam or something heavier, so that according to the mechanical analysis of the type

sampled the soil would be a light silty clay loam on the surface as compared to a fine sandy loam texture for the class 3 land here. The other 15 borings indicated that the land there is subject to seepage in places and with an occasional basaltic outcroppings. There are pockets and layers of sub-angular or slightly rounded tufacious basaltic gravel or lava ash. It is porous, carries water some, but is not deep and the general deep sub-stratum there is certainly basalt. The colloid content in this type of land at Sunnyside compared with our Number 3 lands would be fairly similar to plow depth. The colloid content of basaltic land is on the order of twenty per cent for the first two layers, and would certainly be definitely less in the second foot here. Up there there is definite accumulation of the fine parts of the two soils in the second foot. (R. 1130.)

Here in the No. 3 land it becomes coarse and open very rapidly. The Sunnyside soil would have a higher water capacity in the first two feet appreciably higher. Both would have a fairly rapid drainage. I formed an impression that our sand at Sunnyside used more water than the gravel soil unless in some few pockets. The soil here would certainly use more; it is coarse sandy soil. [illegible] Sunnyside a week. (R. 1131.)

West of the Whitman Homestead the minor part of class 4 lands has been in years past cleared and checkerboard dikes built. Much of that land has gone back to sage brush, greasewood and salt grass. Much of the area is unleveled, in native condition, rough and hummocky, except for some good loam near the river. That class 4 land is largely unimproved.

I examined the Welch place near Lowden. Most of the land north of the river, about 20 acres out of the 35, is in native condition; unleveled, greasewood land, rough surface with white and black alkali spots in places. (R. 1132.)

The fertilizer experiments at Eifferts and Millers had run for two years when I was there in 1932. If they were both maintained they would be correspondingly older.

## CROSS-EXAMINATION—POWERS

On the Yakima project the soil down to plow depth would be a little lower in organic matter than the improved class 3 land here, but the organic matter would not carry down as well here as it would there. I made a reconnoissance of the area of number 3 soil on Mill Creek. (R. 1132.)

I saw deep cuts in the material, and at the end of Isaac Street there were numerous excavations for water mains and storm drains. I think a little lower and right up above the city boundary there would be more colloids in the soil. Certainly it is unlevelled and idle land. The soil marked orange on Washington's Exhibit 15 near Milton, and the soil marked orange at the top of Mill Creek—in my opinion—are not the same. The soil at Mill Creek is more droughty, and is practically waste land having gravel pits and dumps. Most of it is unleveled and dry and of extremely coarse texture—a quarter of a section or so. With the exception of this land, I think the No. 3 lands on Mill Creek would in a rough way have the same requirement for water as the No. 3 lands on the Walla Walla. (R. 1133, 1134.)

## POWERS—CROSS-EXAMINATION

The soil between the rocks and gravel in No. 3 soil I regard as recent alluvial material. We speak of maturity, as soil ages ago, it comes to have a layered profile, like a piece of layer cake, a leached surface layer and a zone of accumulation below it on top of the parent material. In the Milton and Freewater area in the No. 3 soil, there has been heavy manuring and disking in of alfalfa into the surface soil, and the organic content is rather good, and in the sub-soil there is not so much. The first 6 inches to plow depth our test indicated on the order of 5 or 6 per cent organic matter. (R. 1025.)

The gravel size tends to increase vertically in the No. 3 soil; there are more cobbles in the sub-soil. Generally, but not always, it gets larger as you go down. If the soil in the

No. 3 area between the rocks extended down 5 or 6 feet with the gravel well filled with fine earth of good quality that would be comparatively productive soil. Wash gravel and a high percentage of stone would limit the fertility. The point of permanent wilting is determined by growing sunflowers in fruit cans, and we transplanted the sunflowers sealed in it until they are not revived when placed in a saturated atmosphere for a period; in a humidor that is kept damp or at a humidity near a hundred per cent. That is checked by taking a sample in the field where the growth shows wilting and can be indirectly determined further by a factor that is fairly reliable for most soils from other critical moisture points. Then your excess point can be determined from moisture equivalent tests, subjecting small samples to a force of a thousand times gravity in a centrifuge for a half hour, and then determining the residual moisture. That practically checks up with your excess point that you find under field conditions from the time you go upon the land to seed or mulch time after irrigation and left to soak. That can be further checked by saturating a core of soil in its natural field structure and draining it to constant weight, and then sampling that, but the value you get then has to be corrected by a factor. It is about a quarter too high. (R. 1026, 1027.)

We determined the 25 per cent error by field results and laboratory results by taking thousands of moisture determinations on uniform soils that we are very familiar with and making that study and arriving at a factor, which I will say is an approximation, but based on a large number of determinations. We have made 10,000 moisture determinations in one season in the Willamette valley and the excess point is about 27 per cent, and a point where it gets dripping in a permanent saturated atmosphere is near 34 to 36 per cent. (R. 1027.)

The orchard irrigation investigations of recent years indicate it is better from the standpoint of tree growth and

perfection in yield and quality to irrigate before the soil reaches the wilting point. In determining the fertility of the soil in these orchards there was a regular analytical fertilizer experiment in each of the two orchards for two years. They applied the fertilizer on the land and measured the yield. Ten or 12 plat fertilizer experiment, a dozen trees to a plat were run and then we analyzed the soil. That has been taking place for three or four years. I feel that on the No. 3 lands they should be irrigated about once a week for tree crops, and for tomatoes at least twice a week to prevent wilting. (R. 1028.)

If the water supply was cut to one miner's inch I wouldn't ask—where the ownership is a 7 acre average—that they be equipped for very many different crops. There is always a little room for improvement, but there are economical limitations. The amount of one and a half miner's inches continuous flow as I have suggested is an unusual amount of water, but it is for a very unusual soil. The unusual conditions which I have considered is the very limited usable water capacity, and no ground water within a distance that will help meet the situation for the roots, and a long, relatively hot growing season and intensive farming. (R. 1029.)

In our experiments at Medford we were surprised that we had good results with more water than was anticipated. You can drown out some crops; some are more sensitive to excess water than others, and drainage conditions will help determine how they will grow. The period of dry years we have had enters into my determination as to the amount of water the people should have only in a general way. Forest fires and over-grazing reduce the litter and hasten the run-off. On the No. 3 soil early in the season dust carried by the wind and water may coat over the furrows and then penetration may be a little slow. The organic matter aids the penetration and lateral spread of the water applied. (R. 1030.)

Water will not go sideways much as long as it can go down. I think that the spread would not be good as long as the ground is open below. There is nothing unusual in the soil between the rocks that would require more water than in soil of that texture anywhere. The rocks hold nothing if they constitute three-quarters or two-thirds of the volume; the reservoir is then very limited. The soil between the rocks would permit a lateral spread of water, but it would have to detour around the rocks. (R. 1031.)

## POWERS—RE-DIRECT EXAMINATION

Land that is sub-irrigated would be benefited by the upward movement of moisture, but here in the coarse gravel the water drips through and runs away, and there is practically no wick action. The water doesn't climb back in the capillary attraction and the ground water is deep enough that the roots do not benefit from it. I have seen quite a bit of the preparation of ditches upon lands here when getting ready for irrigation. In the last few days we saw most of the ditches being cleaned. (R. 1031, 1032.)

In 1914 when I first became acquainted with this district there were good bearing orchards here then. I believe from my examination of the district and continued knowledge of it that they are using their water fairly well, comparable with other districts. I would consider the methods of irrigation and the irrigation practice reasonably efficient, and fairly comparable with what reasonable irrigators use in other places for similar soils.

I think that four-sevenths of an inch, Oregon measurement, with continuous flow would be required to irrigate the 1 and 1-R and 1-D soils. (R. 1033.)

I speak only of farm duty; at the farm headgate. The 1-R I segregate partly into 2-T, being the second class the topography being rather steep and somewhat broken it might need a little more water, two-thirds of an inch where the other had four-sevenths. For Youngs 2-A class there is

required about seven-sixths of an inch. The 2-B class is only 6 inches to gravel, the furrow opens most of that, and it should have the same amount of water as the 3 class. It is impracticable to have more than a few duty classes. Youngs soil map covers both irrigated and non-irrigated lands. He took in too little, and then he took in too much. That is the pink color, and some of the 1 below Walla Walla is hummocks or hillocks that have never been leveled and are dry. A great deal of the 5, and below Whitman homestead a great deal of the 4 are unleveled and unfitted for irrigation. And above the city of Walla Walla I estimate there are 80 or 100 acres of waste lands, gravel pits, and city dump grounds and about a half section or more of dry stony land that is practically idle. We eliminate land that has a reaction value above 9 to 9.5, hard greasewood land. We have eliminated close to 50,000 acres from Oregon projects in the last eight years mostly on that account. The irrigation methods and diversions on the Washington side are similar to that on the Oregon side as to efficiency. There is some very crude irrigation down below Whitman's homestead, in the vicinity of Lowden. There is no particular difference in practices on either side of the line. (R. 1034, 1035.)

## RE-CROSS EXAMINATION

I have not observed the measuring points from the natural streams; I have left that to the engineers. (R. 1036.)

### *Wilbur L. Powers*

## DIRECT EXAMINATION BY MR. COCHRAN
## (1171 to 1173)

The West City line of Walla Walla apparently is the west side of Section 18. It comes to the center of 19, and from the center of 19 in 36-7 runs West a forty, and then down to the bottom of the section; then the city apparently

joins the United States Military Reserve where there is a remnant of a fan extending beyond the limits of the city to the west. There are a couple of little areas of three land north of College Place, also in Section 23. The area lying in the southern part of the orange shaded district has the south eighty in the SW¼ of Section 29, which is apparently the fairgrounds. Most of the next forty east of it is within the city. The Southeast forty in Section 29 is apparently outside of the city, and according to the map, a small part of it would be class three. (R. 1171.)

There is a little No. 3 land in the north part of Section 32 which is apparently outside of the city. The fairgrounds is apparently in the South half of the Southwest quarter of Section 29. (R. 1172.)

Oregon's Exhibit No. 45—a list of bridges across the Walla Walla river and their locations, was then introduced in evidence.

### *F. A. Fullerton—Examination*

(Pages 1037 to 1041)

I live at Milton and I am business manager for the city water department. I look after the business end of the water department. We have a record of the metered use in the city. (R. 1037.)

I made a hurried examination today of these records. They show a variation in the total metered use per day. For January, February, March and April it shows two million gallons a day consumption. In the summer months when sprinkling and irrigation goes on there is a consumption of from three to three and a half million gallons per day. August was the peak month. From April to the peak in August we have a graduated raise from two million gallons to three and three and a half million gallons per day. (R. 1038.)

## CROSS-EXAMINATION

None of our users are metered. We have a total meter of the water before it is sold out to the patrons. It is a main-line meter and measures all the water that goes into our mains. It is located at the head of our main just below our chlorinating machine; below our new power plant, but above our old power plant and almost directly at the new power plant. It is a Sparlin flume meter and operates continuously.

We don't have an absolute record every hour of the day, but it is read every day. After the water is metered in it is distributed to the consumers and there is no point between the metering place and the distribution to the consumers where water is turned off to a stream. The water is used for household use and for irrigation of lawns and small garden plots; for sprinkling purposes on the gardens. (R. 1040.)

Our regular charge is $1.50 per month and in the summer we have a sprinkling charge of a minimum of 35 cents at the rate of 70 cents per 100 square yards. We measure that at each man's property having a record at our office of the size of each man's property and then determine the charge for sprinkling and the number of square yards there. (R. 1041.)

## RE-DIRECT

The water passing through the meter is not passed into the flume for the operation of the old power plant. It runs into our city distribution system and is not returned to the stream.

## *S. T. Harding—Testimony*

(Pages 1043-1099)

I am an engineer living at Berkeley, California. Graduated from the University of Michigan with a B. S. degree in civil engineering. (R. 1043.)

Since being out of college I have specialized in irrigation from 1907 on. My experience includes instruction, preliminary investigations, water supply study, land classification, and water requirement work particularly. I was three years on construction work with what is now the United States Bureau of Reclamation, and in later years have been consulting engineer for them, on the adjudication of the Truckee river for the Newlands project in Nevada, and Stony creek for the Arland project in California. I have been consulting engineer for districts operating projects built by the Bureau of Reclamation, such as the Sunnyside Valley Irrigation district in Washington, the Truckee-Carson district in Nevada; the Verde-Nevada Irrigation and Power district in Arizona. For three and a half years I was in charge of irrigation investigations for the United States Department of Agriculture in Montana and have done work for them in Idaho. (R. 1044.)

I have been consulting engineer for the Federal Land Bank of Berkeley on water supply questions in various counties in California; for ten years from 1920 to 1929, and to a lesser extent to date I have been consulting irrigation engineer for the state engineer of California handling studies of water supply feasibility districts, questions of water requirement and land classification. With that public work I have been engaged in consulting practice for other forms of organization, including land classification, water requirement matters for the city of Santa Barbara, and Los Angeles, the Los Molinos Land Company and other organizations. (R. 1045.)

I am professor of irrigation at the University of California giving some of their courses in irrigation, practical

operation and maintenance, irrigation and organization, and institution. My experience includes experiments in irrigation under field conditions. (R. 1045.)

For two seasons in Montana we took land on farms and measured the water applied and the yields obtained trying to determine the effect of variations in water supply on the yield. On the Minidoka project in Idaho in 1915 I made a similar study of water requirements on sandy types of land. In 1917 I made a similar study for the Sunnyside division of the Yakima project to determine reasonable use for the different types of soil on that division. I did similar work in connection with the Truckee river adjudication, where we took selected lands and operated them under measured quantities of water observing the effect of the difference in quantity on yields and frequency of irrigation and the amount necessary to apply at each application.

I arrived here on March 29th (testimony given April 5th), and have spent the time since then until now in field observations, going over the data collected for the case, examining the exhibits and testimony, and other records. (R. 1046.)

I have studied the decrees involved and the test places. I visited each of these test places and made a general study of the other areas. (R. 1047.)

I have studied the soil map and the under-ground water studies. I examined certain of the pits and the channels to determine the soil structure. I had copies of the soil map—Exhibit 15—with me on my field trips, and, in a general way, the soils indicated on the map are correct. I think the map is sufficient as a soil map. It is not and does not include all of the details needed in a study of water requirements, but as a basis of the character of the soils and their location I consider it very good. To determine individual ownerships and water rights for individual duty it would need to be supplemented by consideration of individual ownerships and priorities. (R. 1048.)

Some additional detail would be needed in fixing water requirements for individual farms. The prevailing soil around Milton and Freewater is extremely coarse in texture. The soils vary and in nearly all areas there are lands of different types, but in the cone that extends outward from the mouth of the canyon near Milton the upper portion is practically all of very coarse, gravelly, or stony character. In considering duty of water I gave consideration to the texture of the soil as I found it and as indicated on the map. I made a general examination of the water supply; went over the general reports of the stream flow, and Piper's report on under-ground water. I made no detailed analysis of water supply, but examined the records generally. (R. 1049.)

I find the run-off typical to that of many streams, diminishing in the later summer months and the area the stream can serve is largely defined by the supply of these months. In some areas the ground water is near enough to the surface to affect the water requirement of the land. The water table, if sufficiently close to the ground surface, will permit plants to utilize the soil moisture, or where in the depth of soil it has to be moistened at each irrigation. This affects the water requirement of the Oregon lands. If the table is too high it may limit the root zone of the plant and be detrimental to both crops and water use. So far as I could—at this season of the year when irrigation generally is not yet going on, I studied the irrigation practices of the district. I studied stipulation No. 3 on irrigation practice; I read the testimony of the witnesses who operated lands on the test places; I observed the character, the condition of the lands, and the irrigation systems in the field as far as I could at the present time. I observed the furrows as far as I could. Ditch cleaning and furrow cleaning is in progress now in some areas. I could see generally the length of the furrows and the testimony of the witnesses covers the practice which they follow during the summer

period. In my opinion, the practices—considering all of the local conditions—are representative of reasonable practice and reasonable use. Practice which is reasonable varies with climatic, crop, water supply, and economical conditions. The general character of practice as to length of furrows and the arrangement of the land is representative of that usual under similar conditions. The grade of the land affects the length of furrows. The size of the furrows indicates the heads that could be turned in them, and seem to be as large as could be handled efficiently. (R. 1050.)

With the furrow method the irrigator can use smaller heads of water than with the flooding method. He can adjust the furrows which he runs at a single time to the head of water which he has available. The slope of the furrows which usually run down the steeper slope of land is enough to give a fairly good flow through the furrows. The testimony indicates that the users turn in a reasonably large head into that furrow, and that it works through the length of the furrow in a time shorter than those in some areas following the furrow practice for similar crops. I consider the practice of having a tail-ditch to catch the overflow of the furrows and then convey it to other land or another head ditch to supply other furrows lower down, is a proper, reasonable and desirable practice. It is desirable to crowd a large stream through the furrow in porous soils as quickly as practicable so that the entire length of furrow may get a similar period of time for absorption. Crowding a larger stream through will result in some waste at the lower end, which it is a good practice to pick up and redistribute into lower furrows. (R. 1052.)

The method employed here is very generally used in the northwest. I worked on coarser soils in Sunnyside, Minidoka and the Truckee river area and while each of these projects have coarse textured soils, I do not consider that their soils are as extremely coarse as those found on the main gravel cone here. (R. 1053.)

They, therefore, would not directly furnish a standard of practice for this district, but would furnish information useful in comparison. As far as I could—by observing the general condition of the channels and the available records – I studied transportation losses but made no measurements of my own. I have made measurements and studies of seepage losses in other districts. (R. 1054.)

Seepage loss varies with the material with which the channel is constructed and the size of the channel. The percentage of loss per mile in some material is higher in smaller channels. Here the river is divided into prongs or channels natural in origin, and which run through coarse material. From the size of the channel and the water carried as indicated by the record, I consider a 20 per cent conveyance loss as reasonable and such as one would expect to find with channel conditions in these soils. I observed the ditch systems in the field on the places visited. (R. 1055.)

At present their condition is variable; some have been cleaned out and some have not. The natural channels go down the cone generally on the steepest slope, approximately 1 per cent. The first farm turn-outs take out at right angles on a rather flat grade and the furrows then run on the steeper grade. The farm ditches taking out on the flatter grades catch some of the silt in the water, and grass growing in the ditch helps this practice. Some of the ditches recently cleaned showed very little gravel, the silt occupying most of the ditch bed. This would give a lower rate of seepage from farm ditches than would occur from the furrows which are not silt. The farm ditches prepared for this season's operations are typical of ordinary earth channels for farm conveyance, using the size of heads which are the practice here. The average size of farm is small, which results in a relatively short length of farm ditch. Many of the farms divert directly from the natural channels and have a lesser length of farm ditch than is usual in most areas. (R. 1056.)

The natural channels in effect take the place of the laterals in the ordinary system. I studied the Oregon decrees relative to the amount of water fixed for beneficial use. It would make a difference in operation where the natural flow of the stream, rather than storage is depended upon. Whether it would be necessary to carry these differences into the decree would depend on local conditions. With storage in a dependable amount sufficient to remove shortages, use can be figured on a steady demand basis to a greater extent than where the supply is subject to fluctuations of the natural stream flow. (R. 1057.)

The seepage losses mentioned in the decree were the Pleasant View canal, where 20 per cent is allowed, and in the Hudson Bay ditch an allowance was fixed on the historical record of diversion which would supply a seepage loss.

The decrees fix a maximum diversion with a limit to reasonable use and is the usual form of such decrees. In streams where storage is important the decrees often fix a total quantity that may be diverted during the season. In the decrees that I am familiar with that has been done, and a maximum rate of diversion fixed based on the water requirements of the land during the month of maximum demand. Here that would be July and August. (R. 1058.)

The rate of delivery during that period determines largely the results and yields the farmer could obtain from irrigating crops maturing late in the season. With a shortage of water during these months crops which can be matured with water during earlier periods would need to be grown, or pumping plants or other substitute sources provided. The acreage which can be given full service from the direct flow of the stream is limited to the area which it can supply during the period of maximum demand. On most streams supplied by melting snow or ground seepage of the drained area which comes from melting snow, the maximum crop demand comes at a period of minimum

stream flow. In determining duty of water frequency of irrigation is of primary importance. The amount of water an irrigator needs depends on the amount with which he can cover his land at each irrigation and the frequency with which he has to cover it in turn fixes the total amount of his use during any period. Frequency of irrigation required is ordinarily fixed by the practice and experience of those actually irrigating the crops. The land owner may not be familiar with methods of measuring water so as to determine or know the quantity of water which he uses, but I have found in all of my experience that actual irrigators can and do know the frequency with which it is necessary to irrigate for different crops, and that water requirements can be built up from that frequency to the required amount to be applied at each irrigation. (R. 1059, 1060.)

The irrigator is in the best position to determine any injury to the crop from too long a delay in the times of irrigation, and has a more constant contact with the soil and the crops than is obtainable otherwise. Here for soil No. 3 frequent irrigation is necessary. Stipulation No. 3 and the testimony of witnesses on the subject indicates a frequency of seven days on the gravel soil for tree crops with the usual type of cover crop practiced here. While I have not been here during the irrigating season to check that directly, mere general observation of these soils would indicate that whatever the frequency is, it would necessarily be relatively short. (R. 1060.)

I was not at all surprised after examining the soil to find the record showing irrigation at weekly periods to be necessary. (R. 1061.)

I would assume that stipulations fixing that period and the testimony of the land owners represents a reasonable result of their experience. That period is relatively short; shorter than the frequency I have found in other areas in soils, except those of very heavy texture or shallow depth

of impervious sub-soil. I have found lands where it was necessary to irrigate as frequently as seven days, or where soil is heavy clay in which only from two to two and a half inches can be absorbed at an irrigation, and which can't carry the crop for any longer period of time. I have also found that frequency used on shallow soils over impervious sub-soils where a similar moisture capacity occurred. It is also at times found necessary to irrigate pasture crops of shallow rooted grass at relatively frequent intervals on soils of better texture, but for deep rooted crops, such as those mainly grown here to which the seven day period applies, that frequency is shorter than is generally required in other areas. The soil itself is coarser than the soils where I have found longer periods usable, and the seven day period appears consistent with the ten to twelve to fourteen day periods of frequency in areas of other coarse soil. The seven days I mention applies to tree crops with cover crop. (R. 1062.)

The record indicates that for tomatoes and shallow rooted crops a shorter frequency is needed. The record indicates that two and a half acre inches are retained in the soil after each irrigation within the root zone. That would be comparable with water retained in the soil in other places where frequent irrigations are necessary. The fact that frequent irrigations are required is an indication that soil does not retain much water from each irrigation. The crops grown here would be expected to have a consumptive use of moisture and by evaporation through the soil of about that amount per week during the main summer months. The fact that irrigation is required with that frequency checks, in a general way, the material regarding the moisture capacity of the soil. If these soils could retain much in excess of that amount of water from an irrigation they would not need irrigation at such frequent periods. I studied the amount of water required for a single irrigation as well as I could at this time of year from the records.

My conclusions are based upon the general observation of soil texture and experience in other areas. The testimony of the landowners as to the number of furrows they run, the time water remains in the furrows and such other information as I could collect at the present time. (R. 1063.)

The soil is relatively coarse, contains a large percentage of gravel and rock fragments of larger size. The finer soils within the gravel reaches from medium to fairly light texture through which water would move readily. I found from the information obtainable that the irrigators use from five to six inches depth of water for irrigation, which is about what I would expect to find necessary to get over these lands with the length of furrows and the methods employed, and I consider that a reasonable result. As to the depth of soil that retains moisture for tree use, that diminishes from the surface downward. There is a larger percentage of fine earth material in the upper foot to 18 inches, becoming less below, until below three feet there is practically no soil useful to the plants, so the moisture storage capacity from an irrigation is limited practically to what the soil could retain within the upper three feet, and that more largely in the upper foot to foot and a half than in the full three foot depth. (R. 1064.)

I saw some trees that had been pulled out and the general character of the root growth was shallow. They spread largely in the upper two feet or foot and a half of the soil, which indicates that the tree has adapted its growth, as it usually does, to the depth of soil to which moisture is most readily obtainable, and in this area that was the surface soil. I made no direct tests to ascertain how much of the water would be retained in the soil, but I have studied that proposition in other places, and from that information I formed an opinion, having made a good many of such studies involving many thousands of soil samples as to the moisture content of soils before an irrigation and after, so

that the amount of moisture could be determined. The soils here are clearly ones of limited moisture holding capacity. If the soils can only carry for a week's time from an irrigation, and from five to six inches are applied at each application, obviously the difference becomes deep percolation. (R. 1065.)

With five to six inches depth of irrigation and from two to two and a half inches useful water it leaves 50 to 60 per cent for deep percolation. Evaporation should not be much because of the general shading of the cover crop. The transpiration of the cover crop to an extent balances the saving in evaporation. The two and a half inches consumption includes evaporation as well as transpiration from the trees. The figure of two and a half inches checks to my experience in other areas on the land to which water is applied and consumed where soil conditions are such that percolation losses are less. We have many areas in California where the general practice physically is similar to that here. Water is used liberally in the early season when available. The ground water is built up and later drawn down by pumping, and studies there indicate that the amount of moisture secured in transpiration and evaporation is about the amount which I have stated as my estimate applying here. (R. 1066.)

The frequency of irrigation by soil test experience in other places and the transpiration of moisture in July and August coming from crops raised at that time check and indicate that two to two and a half acre inches of water is retained by the soil after each irrigation. To deliver that amount of water a five to six inch irrigation weekly is applied and we make some allowance for loss by seepage in farm ditches. It works out closely to an inch and a half per acre continuous flow using the Oregon value of the miner's inch. (R. 1067.)

I have studied water requirements of the coarse soil. I paid little attention to the coarse soils in the Washington

portion. In Oregon they occur in a fairly compact and solid body extending into and out from the canyon of the Walla Walla river near Milton and Freewater. There is another area near the state line east of the West Prong generally of similar coarse texture. There are others scattered and smaller, but the two mentioned represent the principal ones. (R. 1067.)

In these coarse soils it is not practicable to get over the lands by irrigation without delivering more water than the soil can retain. In fact there are very few areas where irrigation does not result in some deep percolation loss which is as much as 50 per cent in soil areas as coarse as those here. In some heavier soils the difficulty is in getting penetration, and we have almost no deep percolation, for instance, in our clay adobe lands used for rice production in California where water stands on the lands in excess of 100 days per season with practically no seepage; but for soils of medium and light texture there is very little irrigation practiced which does not result in the rise of the water table, indicating percolation from the lands as well as canal seepage. In addition to the fact that you cannot help having deep percolation there is benefit from deep percolation, but if carried to an extreme it would be injury. (R. 1068.)

It is generally considered there should be maintained some downward movement so that concentration of salts will not occur in the surface soil. To the extent needed in the qualities of most irrigation waters, this can be accomplished by an occasional deep irrigation and would not require the amount of percolation that occurs on these lands. I observed the headgates in a general way, but made no seepage investigation of them. The take-outs which I saw were heavy concrete construction, substantially built. Some weirs were installed but were not used as measuring devices at this time. I saw the construction of the frog, and the diversion at the red bridge where the Little Walla Walla is taken out from the main Walla Walla. (R. 1069.)

From a general survey of the water supply, soil conditions, distribution of the natural channels, I would say that in general the system of irrigation practices is reasonable and up to standard practice. It is difficult to define a standard of practice. We really should divide it into two parts, one the distribution system and one the use by the land owner on his own land. Here they use the natural channel to a greater extent for the conveyance of water than is customary in most areas because of the natural condition of diversion of water into various channels distributed over this area. The structures I have seen for the control of these channels represents the normal or usual type for conditions such as are found here. The channels themselves being natural, although some have been straightened for convenience and farm developments are less regular than would be the case if this area had been covered by an entirely artificial canal system. But they represent the natural development of the area under its physical stream channel condition. The farm systems—considering the size of the individual unit and other conditions—are typical of those that are found in many areas. An seven acre holding, as shown by the stipulation here for an irrigated farm for the support of a farm family is relatively small. We approach it and may reach it in some of our very highly developed citrus areas in California. It may also be reached in areas growing intensive truck or other similar crops, but for general crops the size usually considered as adequate for the support of a farm family, even with very intensive cultivation, would run 20 to 40 acres. In our central California orchard districts we would find the average considerably higher. I made a detailed study of the Peach Bowl in the Sacramento valley of California, an area comprising some 25,000 acres near Yuba City in 1931. We canvassed over 700 individual holdings as to their condition and irrigation practices, and while there were a large number of five and ten-acre tracts or units, the general size of the tract on which production and returns

were being maintained during periods of low prices, ran 20 to 40 acres, or more. (R. 1070.)

I studied the test plats irrigated by Liffert, Herman, Herr, Karker, Knopf, and Roeder. (R. 1071.)

I examined the records of experiments on the farms, the testimony of the owners and also visited each of the tracts. There were nine of these tracts distributed over the general area; all but one generally included some of the coarser soils. Bookout's soil, farther to the west is not of class 3 soil. The others in some cases were entirely coarse land; in others they were near the margin of the area and included some other soils. Six of the tracts were on the main body of the gravel cone. Two of them were on the West Prong of the Walla Walla, on the area of coarser soils in one case, and on better soils in the other. Of the six that were on the main cone, three of those—Herr, Karker and Roeder, were entirely on class 3 soils. I took the record of their use by months, averaged the amount so shown by the months of July and August for these three tracts of class 3 soils and the average was 1.45 miner's inches per acre of continuous flow for that period. Three of the tracts included some soil of either class 1 or 2-A. The Knopf tract used more water, although his soil is not as difficult to handle as the straight class 3 types. The Eiffert land also used larger amounts of water averaging in August 1.8 miner's inches per acre. Accepting their record as to necessary frequency of irrigation and taking the soil as I was able to observe it, the general arrrangement of their distribution system, I would consider the amount of water used represented a reasonable application. The West Prong decree was separate in Oregon from the main river decree. (R. 1072, 1073.)

I examined the decree as to the Hudson Bay Company and found that they were decreed a diversion of 75 second feet and for an acreage of 2600 or 2700 acres, which is equivalent to a second foot to 36 acres, or 1⅛ miners inches per acre. The lands under that canal vary from the coarser

grades in the upper portion to soils much more retentive in the lower portion. I had no segregation of the areas in the different classes and did not try to segregate them. The rates included conveyance in a longer canal than those used for the other lands in the stream, and the lands extended farther from the stream channel than in the case of any other rights. As to the Pleasant View with a permit of one-half inch per acre and a 20% conveyance loss decreed, the use of pumping plants for supplemental water supply is frequent. This is indicated by the location of the pumping plants on the general map in evidence, and by my field observations. The priority of the right is late and the supply available by direct diversion shut off in the summer season, and on the coarser soils supplemental water would be essential. The Bookout land is irrigated from that ditch. This land is much better textured than the coarser land, and relatively free from gravel in the upper few feet. Irrigation from one to two and one-half week intervals is necessary, and the one-half miners inch allowed by the permit would supply enough to give a four-fifths inch depth of irrigation at each application, and since the soils are fine-sandy-loam with a good moisture holding capacity, it would probably be covered with that rate of use. I observed the decree mentions that the one-half miner's inch allowed by the permit is apparently not sufficient for much of the land under the ditch. I think the comment refers to the gravelly lands rather than the lighter textured lands farther west. The records show the irrigation supply cut off on July 4th, to the Bookout ground. This would have a large influence on the kind of crops grown. Established alfalfa might hold through the season without later irrigation, but its yield on later cuttings would be less. If that is their only water supply it would compel them to go to general farm crops rather than orchards or vegetables. There is a well on Bookout's land. I don't know how extensively he operates it, or if he could overcome the deficiency in his stream supply by the use of

this well. The other lands under the decrees are either under diversion directly from the channels or relatively short diversions to the land itself. They are listed in the decree on the basis of one and one-half miner's inches per acre, measured at the land. The delivery from the channel is—in many cases—so close to the land that the two measurements become co-incident. (R. 1074, 1075, 1076.)

The No. 3 soils in a general way represent one-half of this remaining area. There are some lands extending up the Canyon above Milton in a relatively narrow valley. The soil map Exhibit W-15 shows them to be somewhat mixed in character, with a prevailing coarse soil quite largely 2-B class. These areas lie along the stream where any excess use of water on them would return relatively quickly to the stream channel as indicated by the testimony, and I would not consider any distinction in the rate of use would be needed for them in comparison with class 3 lands on the main gravel cone. My observations in the canyon above Milton did not go far enough to permit me to determine whether there would be any great amount of seepage loss lost from the stream, but the nature of the country—the narrow valley, the steep rise of the rocky hills on the sides, make it a natural inference that it would not cause any great loss from the stream. (R. 1077.)

The northerly lands in Oregon bounding the state line irrigated from springs and lying relatively north of the section line which goes through the McCoy bridge are affected as to their water supply by the irrigation on the cone. The actual use of water by the individual land owners is not affected. My understanding is that the distribution to these lands is separate and distinct from the distribution of water to the lands on the cone. These lands are shown on the soil map and are largely classified as 1-D and 4, both classes of better texture than the class 3. They would not require as frequent irrigation or as large amounts of use. Both of these classes generally have a water table within six feet of the

surface. This height of water table would affect the frequency of irrigation. In this area, over toward the West Prong there are some class 3 lands similar to the lands under the West Prong supply for which the water requirement would be largely the class 1-D or class 4 lands. I have not attempted to make a detailed analysis of the reasonable requirements of the individual holdings in this area. In my opinion it is clearly less than that of class 3 lands, but an actual determination of a reasonable use would involve the consideration of individual holdings, the variations in soil at the margins of the different soils classified and other detailed information which has not been available. If there should be an over-diversion there the return water would move northward. As the soil map indicates, they have a water table close to the surface. The springs rise within this area and the lands served in Oregon on the spring zone are ones on which the present use of water is apparently close to its maximum. We have full evaporation — transpiration from these lands, and any additional use would either raise the water table or move it to the north. (R. 1078, 1079.)

The flow of the springs as shown by Mr. Piper's report fluctuates in sympathy with the elevation of the groundwater in the general cone area, so that water rises in a larger quantity at the time following heavy irrigations on the gravel cone above. The lands are relatively close to the state line and the return to the water table would pass northward into the state of Washington. Along the fringe of the cone of class 3 lands there are small acreages of class 2-B lands. In my opinion it should have the same duty as the class 3 lands. The areas are small and inter-lock and overlap with the areas of class 3. The distinction is one of the soil depth containing finer material, and in view of the small individual areas I would not consider it would be advisable to attempt to make a definite distinction. On the West Prong there were two test places—the Babcock place and the Harris place. (R. 1080.)

The Babcock place is principally on class 3 land. The filling material may be heavier than on the main gravel cone. The ground water showed a depth of five feet at the time we were there and should assist some in reducing the water requirements. The Harris land is better soil. Here the owner testified that he got over his land at monthly intervals, which would indicate either better ground water conditions or better moisture holding capacity of the soil, and it would not have as large a water requirement as the gravel type. The decree on the West Prong is adapted largely from adjustments made by the individual land owners where they classified their lands with a ratio of use over one to two and one-half and issued stock in the State Line Irrigation Co. on that proportion. The decree follows that classification and makes an allowance for maximum use varying from one-half to one and a quarter miner's inches per acre to the different individual holders. The classification recognized in the decree gave to the Babcock place a second foot to 38 acres, and to the Harris place a second foot to 60 acres. (R. 1081.)

On the West Prong the water table is generally fairly close to the surface. There are some 1-D lands and some 4, but the relative proportion of these classes is less than the proportion of the same classes in the general spring area. The seepage from these lands would pass to the north. So far as I have been able to examine the conditions on the lands under the West Prong, the decree seems to be a reasonable adjustment of water requirements to the soil character. The class 3 lands given the inch and a quarter in the West Prong would not be ones of quite as high requirements as the class 3 lands on the gravel cone. I would expect a similar detailed adjustment of the East Prong to result in similar allowances or range of allowances. (R. 1082.)

How much of the area would fall into the different classes I do not have the information to determine. For all of the lands on the cone reaching down to and including the 2-B

lands I consider the present decree reasonable in regard to those lands, bearing in mind that it has a provision that the rate of use specified is the maximum use permitted, and actual use is limited by the requirements for beneficial application. In any such area there are variations, and in going over these gravel lands outcrops of coarser character are apparent, as are also spots of better than the average texture. That is to be expected, because in soils of shallow depth the necessary land leveling in preparing it for irrigation results in a variation in the depth of the surface soil. (R. 1083.)

I do not want to be understood as saying that the amount allowed in the decree is tolerable, because the amount the decree awards is the maximum and protects an excessive use to beneficial use. The point I am making is that in my opinion the allowance of an inch and a half per acre is reasonable for the larger part of the gravel cone, but that within that area, not recognized by the decree but probably existing, one could find small areas where perhaps the land could be handled on a somewhat smaller allowance, but those areas are so scattering and their extent is such that it is not feasible to distinguish them in the decree. I think the maximum allowance in the decree is itself a measure of the requirements of the main portion of the land within the area. A decree applying any uniform rate to a large area should have a rate liberal enough to cover the requirement of the main portion of the coarser types of soil. (R. 1084.)

## HARDING CROSS-EXAMINATION

Piper's report shows the discharge of the springs increases in the early summer months, which is the same period when ground water above is rising. As a result of irrigation and a larger flow of water in the natural channels the flow in spring branches increases during the irrigation season. It is a combination of the two. Mr. Piper's conclusion, as I got it, is that the percolation from the stream channels is the larger factor. (R. 1085.)

The two are coincident and I do not think are separable. As to which may furnish the greater supply of ground water would be difficult to determine. (R. 1086.)

As a quotation of Mr. Piper's diagram or records platted in his report, I state that a very appreciable increase in the supply of water through the springs results during the irrigation season. My statement that irrigation above affects the supply of the streams in the spring district is also based on Mr. Piper's report. I haven't been here during the summer. Speaking of the branches above the frog, my understanding is that water flows through these branches at the winter and spring periods. At low water periods I recall testimony that there were points in these channels to which there was no flow. The silt content would be higher at the flood stages. I haven't examined the stream at flood stages and do not know to what extent it may carry silt. The water now flowing is reasonably clear. Most of the natural channels are of steep grade and gravel is exposed in their bed. I did note places where the channel has taken a turn and the velocity is checked and a silt berm had formed in the bend. Where the diversion channel takes out at right angles to the stream I found the diversion well silted. That came from the main stream; but in the main stream, which is mostly on a steeper grade, the silt would be carried through except where the water is checked. There may be—probably is to a limited extent—silt penetration between the rocks in the stream channels, that would be a matter of velocity and silt content. Even in the channels on the steeper grade there is a slower flow on the margin of the stream, and with grass growing there you would expect some silting on the sides. Under average velocities it is generally true that as a stream gets older—provided it does not change its course -the bed of the stream tends to become more silted and more compact. (R. 1087-1089.)

If the supply of water for irrigation of land on the No. 3 soil should become less, I would recommend the omission

of shallow rooted crops. There is very little general change that could be recommended. I doubt if the saving in their farm ditch system would justify a concrete lining of them. In a few instances the length of the furrows could be shortened, but the general length of 330 feet is not unreasonable and the time of from 2 to 4 hours that it takes water to work through the furrows represents a reasonably short time of run. I do not think there is any major change in the character of their construction practice which I would recommend in that area. Any such change would be largely one in their crop scheme, and if the cut of water was too great the irrigation of only a portion of the area. For all the rights under the large decree, if you were going to have a single value of water requirement, that value must be large enough to include any substantial area within the total. If you have only one limit it must be the top limit; otherwise some lands would not be able to get the water they require. While the limit in this decree, except for the two larger ditches, is one and a half inches per acre, there are lands at the north which do not require one and a half inches per acre, and, I understand, are not supplied with an inch and a half per acre at low periods from the flow of the upper stream. They are limited to the water available from the springs. There is to some extent a variety in the character of the soils covered by the main Oregon decree. Under the decree as now drawn, one is entitled to the rate specified in the decree; otherwise it would throw the distribution into the discretion of the water master. (R. 1090, 1091.)

If the use of that amount brought excess irrigation, the other rights would have an opportunity to bring procedure for a further determination. The water master would have no authority to deprive, except where use was obviously wasteful. It is my understanding that the water master does not have judicial discretion to determine these matters. Probably in actual practice there is some give and take in the actual operation of the stream. I understand that

reasonable use is not permanently foreclosed by that decree, but is available for further determination when conditions justify it. (R. 1092.)

As to deep percolation I say it may be either beneficial or detrimental depending upon conditions. It might be beneficial in leaching down injurious alkali salts, and if carried to excess it might be harmful in leaching out available plant food. In this area of coarse soils the tendency would be to leach the soil but not to the extent of depletion. The practice of manuring and cover cropping is based on counteracting deep percolation losses. (R. 1093.)

## RE-DIRECT EXAMINATION—HARDING

A reduction of water allowance to less than the water requirements would change the farmer's crop scheme or reduce the grade of his crop, or cause him to abandon some land, and thus change his crop returns. If a 10 per cent reduction is made, his crop production would be reduced 10 per cent. If he must change the character of his crops the change would be one from what he now finds most profitable to something of less profit, and might determine the difference between a profitable farm and an unprofitable one. I don't want my answer interpreted that if they cut the requirement two or three per cent that these dire results would follow, but any substantial reduction would have that character of effect. In general it would be proportional to the cut. The fourth proposition was that they could pump water to supply the deficiency. That is what a large number of irrigators are now doing. (R. 1095.)

I spent six weeks on the Sunnyside project in 1917, determining water requirements under the extension act of the Reclamation Service, for the fixing of operation and maintenance charges. (R. 1095.)

I was engaged to come into the Sunnyside division and make a determination as to what the reasonable requirements were of the different grades of soil which could be

used as a basis for such a classification. My work concerned the determination of those rates of use, and included a study of soil classifications. I determined the different types of soil, went out at the time when they were being irrigated, followed the irrigation, took soil moisture samples, had the soils analyzed, obtained information on their practice as to length of furrow, the flow in the furrows, time of setting the furrows, and other information to determine the reasonable requirement of the lands. I found no soil that I would consider closely similar to the class three soil in and about Milton and Freewater. (R. 1096.)

There were coarse textured soils, (Sunnyside project) many of them of shallow depth, but they do not represent the large proportion of the lands, public lands, some 60,000 acres on which I worked. There are no lands within that area on the Sunnyside division that requires irrigation at anywhere near the frequency of these class 3 lands on the gravel cone. I found their usual practice was from six to eight irrigations per season on the two latter classes of shallow soils, some of which over-lie rock and gravel, but on their sandy soils, not containing gravel, the number of irrigations range from three or four per season on those with sandy surface soil with heavy sub-soil to retard the downward moisture movement up to four or five irrigations per season on similar surface soils lacking a heavy sub-soil. The longer period which those lands are able to go between irrigations indicates their higher moisture holding capacity. I found also on their sandy lands that the average depth applied for irrigation varied from eight to twelve inches at each application. On the shallower lands the depth varied from four to six inches under their usual practice, and the ability of those soils to retain water was sufficiently greater than those on the gravel cone at Walla Walla that they were able to grow alfalfa with much fewer numbers of irrigation than would be required on the gravel cone.

I found no soil there with the loose underlying gravel that would cause as large a downward percolation as this soil. The soil filling materials in their land is of heavier texture than on the gravel cone here. (R. 1097.)

*Examination—George H. Carter*

(Transcript pages 1099 to 1126.)

I reside at Boise, Idaho, and I am a Civil Engineer engaged almost entirely in irrigation. I went to the University of Nebraska, completed all of the work with the exception of a thesis, had to leave, and am still without a degree. My irrigation engineering experience began in 1908 when I was employed to survey, design, and construct an irrigation project in Southern Idaho. (R. 1099.)

From 1910 until 1913 I was in University. From 1913 to 1915 I was employed by the Bureau of Reclamation on construction of the Arrowrock and Jackson Lake dams, and on project surveys and things of that nature. In 1916 I was employed by the U. S. Geological Survey on stream measurement work. In 1917 I was assistant to the general manager of the Twin Falls Canal Company in Twin Falls County, Idaho, in the operation of a 200,000 acre irrigation project. From 1918 to 1921 I was assistant engineer and chief hydrographer on the Twin Falls North Side Land and Water Project, a large project in Southern Idaho. From 1921 to 1931 I was director of Water Resources and Commissioner of Reclamation for the State of Idaho, a position commonly corresponding to what is called State Engineer. Since 1931 I have been in private practice in Boise, Idaho. I had during that time to study irrigation districts and their use of water and had supervision over and direct charge of about 75 water masters in the State of Idaho. (R. 1100.)

I was in direct charge of all irrigation matters during the time I was Director of Water Resources. (R. 1101.)

I am familiar especially with the use of water upon various classes and textures of soils. The lands in Idaho run

all the way from gravelly lands to very fine, tight textured soils, and there were under my supervision two and a quarter million acres of irrigated lands. The largest and most important irrigation district in the state of Idaho is the Snake River project. At the upper end of the Snake River Irrigation District there are some 60,000 acres of farm lands all on a gravel fan where the Snake River emerges from the canyon and the stream gradient flattens, thus depositing great depths of gravel throughout that area. The water rights on that gravel fan were adjudicated in 1907 and '08 by the Rexburg decree. On the gravel fan the soil in general for the first foot is from 40 to 60 per cent of medium sandy loam, the remaining per cent gravel or small cobbles. In the second foot from 40 to 50 per cent sand, and the remaining percentage gravel. (R. 1102.)

The third foot runs from 30 to 40 per cent sand, and the remaining percentage gravel. From there down the gravel content gradually increases. The soil depths are over 100 feet of this formation. At the beginning of the irrigation season the water table stands 80 feet below the surface on an average and along towards the close of the season it will be about 30 feet higher, representing a variation of about 30 feet during the season. Where irrigation begins the drainage is away from the stream, but as you progress down stream the slope of the ground water table changes so that when you reach the lower end of the section it is a gaining stream. They raise alfalfa, potatoes, sugar beets and grain. I have compared the precipitation tables with the district here. (R. 1103.)

The annual rainfall is similar, but during July and August and September there is an aggregate of three inches more rainfall in that area than in Milton. July and August are the critical months in that area. They use water there from a minimum of 8.7 acre feet to a maximum of 14.83 acre feet. The decrees there average about two miner's inches per acre. The irrigation method is largely flooding; the

heads used vary from three to seven cubic feet per second; the farm areas average from 70 to 80 acres. (R. 1104.)

There is also an area of similar formation, but smaller in size, known as the Upper Wood River Valley. It is around Hailey, Idaho. There are two to three thousand acres of very gravelly land in that project. They use around an average of 8-acre-feet per acre during the three or four months irrigation season. The altitude there is 5200 or 5300 feet. They have a shorter growing season. The decrees there run about two miners' inches per acre. In Idaho a miner's inch is 50 inches to the second foot. In referring to the Snake River lands I was using the Oregon inch; in referring to the Wood River lands I used the Idaho inch, which I commonly use. Translating the Idaho two inches to the Oregon measurement it would be 1.67 inches. I am not as familiar with the soil analysis of the Wood River country. On the surface it appears similar, and also in the ditches and cuts of any kind where the soil is visible. That is the area from Bellevue on up to Hailey and up to Ketchum. In 30 feet it is fifty per cent gravel. There was 70 to 80 per cent sandy loam in the first foot, the remainder being gravel varying in size from pea size to cobbles three or four inches in diameter. The second foot is one-half sand and gravel and clay, and the remaining gravel. The third foot is about fifty per cent gravel and fifty per cent sand, with a small admixture of clay. Their irrigation method is largely flood. (R. 1105, 1106.)

The crops are hay and grain and general farm crops due to the short irrigation season. I think an intensified orchard growth would require more water.

I came here on March 25 and have since been quite industriously engaged in the study of field conditions, or of the various records which are available for consideration. Irrigation practices in general in the valley are quite in conformity with the methods and systems used in other places with which I am more familiar. The method of distribution

of water is common, and I think a well accepted practice. In general the conditions, with the exception of the soils, are similar to other areas with which I am acquainted. I have examined the stream flow records and hydrographs and related data. (R. 1107.)

From my study I think that the method of distribution of water, taking into consideration the soil conditions, the numerous branches of the stream, the nature of the supply of water, is an efficient distributing system under the conditions and circumstances existing. It is a very good distributing system and conforms well to the average practice. It possibly is better than a material number of distributing systems throughout the country.

I also considered seepage losses in the stream system, but did not give a great deal of attention to that. I made my study upon the basis of water delivered at the farmer's measuring gates. I made studies as to the necessity for irrigation frequency of once a week for orchards, and twice a week for tomatoes and short-rooted crops. (R. 1108).

From my general knowledge of soil conditions, crops grown, and the testimony of the various witnesses as to frequency of irrigation required, it appears that the amount of water applied is not more than could reasonably be expected to keep the crops in a satisfactory growing condition. Under the conditions that exist the practice as to frequency of irrigation is a reasonable and beneficial use of water. From my observation, I am of the opinion that the minimum of water that can be applied to these lands in one irrigation is five or six inches in depth. This checks with my experience other places. I have observed that generally speaking five or six inches is about the minimum application under average farm conditions. The application being the minimum, of five or six inches, the frequency will determine the amount of water necessary during any period of time. (R. 1109.)

In speaking of depth of inches I mean acre inches. I visited the test places whose owners have testified here. Studied the record as to use of water on those places, observed the places in detail. I saw that their farming practice was good; that their irrigation appliances and the distribution of water was all that might be expected under general economic conditions, and did not see anything I would consider out of line with good irrigation practice. The test places were, I think, representative of the district. I think the farmers on these places were a good class of farmers. (R. 1110.)

Taking the nine test places, the average use of water during July was 2.52 acre-feet per acre; during August it was 2.09 acre-feet per acre, making a mean for the months of July and August of 2.3 acre-feet per acre, which converted to a continuous flow amounts to 1.49 miners' inches per acre. I consider that delivery efficient under an attempt to deliver one and a half miners' inches per acre, and from all the calculations and observations I can make, I think one and a half miners' inches per acre represents the minimum amount under which these farmers may successfully carry on farming in the gravel area. (R. 1111.)

The distribution of water is quite uniform and as well handled as can be expected. In my calculations I did not use the month of June because there is ordinarily a surplus of water and larger diversions are made then than in later months, and if the month of June is included a higher seasonal use would be indicated than would be the requirement. I wish to make a correction on myself. I did not consider all of the nine test places in my estimates. I eliminated the Bookout place because the soil there is not similar to the other places, which are either gravel lands or lands approaching gravel. Also the right was shut off on the 4th of July, and I could not have a July record. From all my studies I think the water requirement fixed by the Oregon decree is a necessary requirement for the irrigation of the lands

covered by that decree, and is a reasonable requirement, and an amount of water which these farmers must have in order to pursue their farming operations successfully and profitably. (R. 1112.)

On the lands covered in the north part under the springs where the soil texture is finer and the water table higher, irrigation can be accomplished with a lesser application of water; I mean less than one and a half miners' inches per acre. In my experience, the quantity of water available has a relation to the production and prosperity of the project. I observe that with irrigation projects, the general prosperity of the project is quite largely affected by the available water supply. Considering one project in comparison with another the water supply will be a very close measure of that project's prosperity. As the water supply diminishes, land values will diminish proportionately to the available supply which fixes the crop production; so eventually if a water supply is spread out too thin and a man's farm is spread out over too much area, and not enough production per acre, he comes to the point where his taxes and his overhead cost of farming and things of that nature exceed his return. The intensity and diversity of farming is affected by the available supply of water. (R. 1113.)

With a continuous supply of water of a fairly generous proportion it is possible to have diversified cropping so that within a rather wide range he may pursue his own desire in the matter of crop selection, while if the supply is limited there will be two or three crops grown with any profit. Crop yields increase with the available water supply. I noted the crops raised on the No. 3 lands around Milton, and have observed the testimony given with reference to them. From my experience, July and August being critical months for water supply, if the water were decreased below the requirement for raising their crops in the Milton area, that is, decreased some substantial amount, there are several things that would happen. The remaining supply could be applied

to the present irrigated acreage, resulting in a decreased crop yield and decreased quality. On the other hand a portion of the acreage would be eliminated entirely from the area. (R. 1114.)

Again, there might be a change in the crops grown, or as a last resort the farmers might put in more wells and pumps, and at a material cost preserve the amount of water which they find necessary for satisfactory use. The fact that the farmers over this district on No. 3 lands are using substantially 300 wells furnishes an index that the surface supply of water is deficient. Substantial amounts of water are pumped at a compartively high price per acre foot for power, and this proves conclusively to me that the farmers have found a need for that water. It seems to me that it is a general index of the value or necessity of water when farmers pay out large amounts of money for power bills each year. (R. 1115.)

The pumping operations, as shown by Oregon Exhibit No. 42, shows .359 second feet for 9½ acres; to a .727 second feet for 19.7 acres. That represents the amount of water which has been determined as necessary to give an efficient irrigation. In the ordinary use of water by pumping there is a large demand charge which is based upon the peak load of the season. If the load can be maintained fairly uniform, the power bill is thus brought down to the minimum so that the tendency is to hold the use of water or power down to as small an amount as can be successfully applied. I do not think it feasible or practicable for a stream with a flow such as this to make a limitation on water used upon a uniform basis of acre feet for each month. The limitation must be based upon the available supply at the critical months. It would not be permissible or of any value to take the stream flow for the entire irrigation period, six or seven months, average it up and say that the average is the amount that can be beneficially applied each month. (R. 1116.)

If a season's aggregate delivery is to be considered, there should be attached to that a minimum percentage delivery in the months of July and August. A seasonal delivery alone without the percentage available in each month is not a criterion of the value of the water supply. In determining water requirements I considered use records of water upon the land. I think it is of considerable more value than any other information at hand. My experience is that irrigation farmers working under conditions of limited water supply attempting and succeeding in applying reasonable methods, furnished through their conclusions as to the amount of water available during a season are the most reliable guide. I think there is a tendency on one side to approach a theoretical minimum, opposed on the other side by poor or haphazard irrigation farming or just use of water. The problem, as I see it and the theory I pursue, is to reach a reasonable meeting ground between the two extremes. (R. 1117.)

In fixing the duty of water for No. 3 soils, including 2-B soils at one and a half inches per acre, I feel this is a meeting of the extremes for this district. (R. 1118.)

*Cross-examination—Carter*

In saying that this is a reasonable meeting of the extremes I am stating the problem generally and do not have in mind any specific case. There may be cases in this valley where more water is used. I don't know of them. That is frequently the case in any irrigation project. There will be a few farmers who either attempt to use more water or succeed less with the same amount of water than their neighbor. The use of too much water has no bearing upon the crop yield in any substantial way. There are isolated cases where over-use of water is proven, but it is my general observation and experience, considering irrigation projects as a whole, not farms, that in spite of water logging and alkalining of ground and other things that may be attributed to

over-use of water, still the project of greatest or largest water supply is the most successful. (R. 1118, 1119.)

The area I referred to in Idaho consists of 15 or 20 separate and distinct canal companies in the Upper Snake River valley whose rights are decreed in the Rexburg decree. While I have no average figure for their diversions, I have a number of detailed figures of it. I have them for each canal company as a whole, but not the average for the entire area. They have an abundance of water supplied up to the extent of their decreed rights, but anything beyond their decree is very zealously claimed by down-river rights; the prior rights are up-stream. There are a half-million acres of irrigated lands below watching this area for years, attempting to limit their diversions to as small an amount as possible. (R. 1120.)

I know the Twin Falls project. They use an average of 3.8 acre feet at the measuring weir per season. That is less than the Snake River Irrigation District, but the soil conditions are entirely dissimilar. The crop yield is greater per acre in the Twin Falls district. On the Upper Wood River valley the average use is about eight acre feet per season. Some run higher and some run lower. At one small ranch the diversion was almost twenty acre feet per acre; this would be 150 acres out of 2,000 or 3,000. (R. 1121.)

In general they have an ample supply of water with the same zealous watching that the Upper Snake River has. The storage rights and other rights below do not intend to permit these rights to divert any more water than they are entitled to. Due to crop limitations, climatic limitations, etc., their yield per acre is less than at Twin Falls. Outwardly it might appear that the prosperity of these two projects is less than that of the Snake River project, but the bonded indebtedness, etc., and mortgage debts of the Twin Falls country greatly exceeds the other area. The diversions in these projects are quite similar to this country. There is no cost of acquisition of water rights. Small organizations build sim-

ple ditches to divert the water; they do not have costly works and no storage. (R. 1122.)

The stream system here is used by a great many diversions made by the farmers along the stream without any heavy expense in canals or diversion works. I do not believe that anything economically feasible can be done in the way of improvement of the present distribution system here. It seems to me above the average in its present state. I find no saving appliances other than well-constructed channels, confining the water as much as possible; good concrete control gates and turn-outs where rather rapid adjustments can be made of the supply and the water not spread over the country or running wild. It is pretty well controlled I think, with nothing but earth ditches. (R. 1123.)

My understanding is that a number of rights with good priorities on the river still pump to augment their supply. Most of them that are pumping have later rights from the stream which cannot be used in the summer. (R. 1124.)

*Re-direct Examination—Carter*

The Twin Falls project is not comparable in any way to conditions upon the cone here, neither in crop selections, crop raised, or soil conditions. The irrigation season is shorter, the altitude is from 4,000 to 3,500 feet; the 8 acre foot average on Wood River is for a four months period. Computed upon the basis of six and a half months period it would run up to twelve and a half acre feet. (R. 1124.)

To a certain extent the ditches here are sealed by silting. They are what we term "shingled," in some places, and where I could see them the bottom of the ditch did not present the appearance of open loose gravel. Their method of cultivating orchards here with cover crops is prevalent in a material part of the orchard lands or areas that I know; I would not say it was dominant. (R. 1125.)

*James M. Spencer—Examination*

(Pages 1147 to 1156)

I am water master for district number five, State of Oregon, which includes Umatilla, Morrow, and Gilliam counties. The Walla Walla river is in Umatilla County and in my district, and I am in charge of the distribution of water there. Mr. Mason is my deputy. I imagine that I have to spend one half of my time on the Walla Walla river. (R. 1147.)

I spend from two to three days a week here during the summer. I have been administering water here since 1929. For six years before that I was manager of the Lake Point Irrigation district in Medford. I am not a registered engineer, but have studied engineering. I have studied the transportation losses from the red bridge down to the East Side Ditch Company's headgate on the main channel of the Tumalum. In two different measurements I got 13.6 per cent and 14 per cent loss. In one case there was 15.4 second feet at the red bridge, and in the other case there was 13.24 at the red bridge which I measured by current meter. (R. 1148.)

I have experimented to find out how much of a rise and how long continued it should be before we can safely adjust our distribution to take care of it. It depends upon the time. If the permit rights are running—if the Hudson Bay is running and the Pleasant View is running, all of the excess is thrown into them. The first thing we do before cutting any priorities is to limit the old priorities to their actual right. Before we cut off a permit we insure that we have a practical inch and a half delivery to all the older rights, so that there is no over-delivery to the older rights. We have determined by cut and try methods what amount of water is necessary to turn into the various natural channels in order to carry to the diverters from those channels the amount of water decreed to them. The weirs have been checked at least once a year since I came on, and adjustments

made, and the only way you can get at the transportation loss is to take your lower weirs and insure that they are delivering the requirement. (R. 1149.)

If they are not delivering it you must go through and cut your weirs until the lower weir is delivering in proportion. If you tried to deliver from the head the exact amount of water due the ditch, it would not arrive at the lower areas. There is no way to get at what that would be without trying it, and that is the way it has been built up, is by cut and try. In this way we have determined it takes from 17 to 20 per cent, and to the East Crockett it has gone as high as 22 per cent. That check has been made annually. If the water is available we make that allowance for the East side ditch. I assisted in checking to ascertain the exact acreage decreed, and eliminated from the West Crockett, the East Crockett, the Stillman, the Ford, the East Side ditch, the Powell, the Perkins, and the Tumalum ditches. Perry and Mason helped. We checked our decree and the list we had made before against the list we were making up. We referred back to the maps. We had our decree adjudication map and delivery sheets. The figures were turned over to Mr. Humphrey. We do not start measuring water from the river when there is a surplus over and above all rights on the Oregon side. When it is cut down so that there is no surplus we start measuring water. When the stream falls enough so that all priorities cannot be supplied we start eliminating priorities. (R. 1150, 1151.)

If we must eliminate priorities upon the Ford branches, it takes from three to four days, and upon the Crocketts it takes about the same. Mason does that; I have left it to him. I would not attempt to work over the delivery system unless the increase in flow was over ten second feet in the summer time. If it is, we—as a rule—cut it into the Hudson Bay. If there is a definite and sustained rise in the stream we would not continue to do that. The Hudson Bay would not accept it, because it would cost too much to take care of it, and we

have no other right to use it on except to distribute it in our own systems. If the rise continued only for a day or two, I would not pay any attention to it. (R. 1152.)

I would not make any adjustment for it. If a depression continues only for a day or two I pay no attention to that; in fact we let a depression last considerable before we make a cut. After the measuring season starts we turn no river water down to supply the water rights on the spring branches below the gravel fan. Some gets through for that purpose, but we do not turn any down for that purpose. The river water is used to supply the rights on the gravel fan and above, and to the Pleasant View and the Hudson Bay during the time their priorities can hold it. (R. 1153.)

The Spring branches are separately administered and are distinct from the main river. (R. 1153.)

*Cross-examination—Spencer*

I checked the loss of the main stream between the red bridge and the East Side ditch on July 13, 1932. I also metered the stream at the red bridge on July 11, 1930. The stream at that date at the red bridge was 13.24 second feet. The pumping plant at the cemetery was using one and a quarter second feet. Below the swimming pool I had 13 second feet. At that time there was apparently enough seepage back from the Little Walla Walla to off-set the pumping plant of the cemetery. I measured the Tumalum ditch delivery, (the nursery was not pumping at that time), and the East Side delivery; and there was a loss of 1.8 second feet between the point where I measured last and the final delivery to these two channels. (R. 1154.)

There was no other delivery. On July 13, 1932, I metered the Tumalum river—15.4 second feet; I metered the Tumalum ditch—2.3 second feet; the East Side ditch—10 second feet; the Miller Nursery was pumping one second foot. There was a loss of 2.1 second feet. Both times I measured

it, water was being diverted through the Little Walla Walla, and only a very small part going down the river. I can't say certainly, but I don't think the Hudson Bay was diverting any water at the time. (R. 1155.)

At that time these measurements were made, the East Side ditch was measured below the railroad bridge, at the old weir. There is a new weir there now, just above the railroad track; that is, the diversion is above the railroad track and the weir is just below the railroad track. (R. 1156.)

The foregoing is respectfully submitted,

I. H. VAN WINKLE,
Attorney-General of State of Oregon,

GEO. T. COCHRAN,

C. Z. RANDALL,
Special counsel for State of Oregon,
Attorneys for defendant State of Oregon.

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# TRANSCRIPT OF RECORD

## Supreme Court of the United States

OCTOBER TERM, 1935

In Equity

## No. 11, Original

THE STATE OF WASHINGTON, COMPLAINANT,

*vs.*

THE STATE OF OREGON

**Stipulations and Exhibits**

FILED OCTOBER 14, 1935.

# SUPREME COURT OF THE UNITED STATES

**OCTOBER TERM, 1935**

**In Equity**

# No. 11, Original

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THE STATE OF WASHINGTON, COMPLAINANT,

*vs.*

THE STATE OF OREGON

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## Stipulations and Exhibits

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# IN SUPREME COURT OF THE UNITED STATES

October Term, 1932

No. 11, Original

THE STATE OF WASHINGTON, Complainant,

v.

THE STATE OF OREGON

ORDER APPOINTING SPECIAL MASTER—February 20, 1933

The return of the complainant to the rule issued herein to show cause why this case should not be dismissed for the want of prosecution, is received and filed.

The motion for the appointment of a special master is granted, and it is ordered that William W. Ray, Esquire, of Salt Lake City, Utah, be, and he is hereby, appointed special master in this cause, with authority to summon witnesses, issue subpoenas, and to take such evidence as may be introduced and such as he may deem it necessary to call for. The master is directed to make findings of fact and conclusions of law, and to submit the same to this Court with all convenient speed, together with his recommendations for a decree. The findings, conclusions and recommendations of the master shall be subject to consideration, revision or approval by the Court. The master shall be allowed his actual expenses and a reasonable compensation for his services to be fixed hereafter by the Court. The allowances to him, the compensation paid to his stenographic and clerical assistants, and the cost of printing his report shall be charged against and be borne by the parties in such proportions as the Court hereafter may direct. If the appointment herein made of a master is not accepted, or if the place becomes vacant during the recess of the Court, the Chief Justice shall have authority to make a new designation which shall have the same effect as if originally made by the Court herein.

[fol. 3] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 1—RELATING TO DESCRIPTION OF STREAM SYSTEM, ETC.

It is hereby stipulated by and between the undersigned counsel for the respective states:

I

That the rights specified in the abstract of water permits by the State Engineer of the State of Oregon, and in the decrees of the Circuit Court of said state for Umatilla County, in the following named cases, towit:

(1) Decree on the mandate In the Matter of the Determination of the Relative Rights to the Use of the Waters of Walla Walla River, etc., made and entered under date of February 25, 1933.

(2) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Pine Creek, etc., made and entered under date of March 17, 1924.

(3) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Middle Branch of Mud Creek, etc., made and entered under date of September 11, 1916.

(4) Decree In the Matter of the Determination of the [fol. 4] Relative Rights to the Use of the Waters of East Branch of Mud Creek, etc., made and entered under date of November 28, 1910.

(5) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Dugger Creek, etc., made and entered under date of March 5, 1917.

(6) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Goodman's Springs' Branch, etc., made and entered under date of June 29, 1911.

(7) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Johnson Creek, etc., made and entered under date of September 11, 1916.

(8) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of South Branch of Mud Creek, etc., made and entered under date of November 29, 1910.

(9) Decree In the Matter of Determination of the Relative Rights to the Use of the Waters of West Prong of Little Walla Walla river, etc., made and entered under date of September 11, 1916—

and that the rights specified in the abstract of water permits issued by the State Supervisor of Hydraulics of the State of Washington and in the decrees of the Superior Court of that State, Walla Walla County, in the following named cases, towit:

(1) Decree In the Matter of the Determination of the Rights to the Use of the Waters of the Walla Walla River, etc., No. 19075, made and entered under date of September 12, 1928.

(2) Decree on Remittitur In the Matter of the Determination of the Rights to the Use of the Waters of Doan Creek, etc., No. 14293, made and entered under date of December 1, 1923.

(3) Decree In the Matter of the Determination of the Rights to the Use of the Waters of Stone Creek, etc., No. 15409, made and entered under date of July 10, 1923—

[fol. 5] are hereby accepted and admitted as the relative individual rights of the parties named therein, and of their successors in interest, in their respective states, for the use of water, in the amounts, for the purposes, and at the places or on the lands, set forth in said respective permits and in said respective decrees.

II

That copies of said abstracts of permits and of said decrees shall be admitted in evidence in this case as competent proof affecting the respective rights of the two states, provided that the admission of the same, or of any part thereof, in evidence in this case, shall not be construed as, or held to be, an admission, waiver, abridgment or modification of any of the rights of either state as against the other in this case, relative to the following:

(1) The rights of the Gardena Farms District, successor in interest to the Walla Walla Irrigation Company.

(2) The water requirements of the lands to which water is awarded in any or all of said permits or in any or all of said decrees.

(3) The classification of soils of the lands watered from the streams of the two states.

(4) The past and present physical conditions of the Tumalum section of the Walla Walla River in the State of Oregon, and their relation to the diversion of the water of the stream through the Little Walla Walla River to the rights served thereby and to the diversions from the streams in the State of Washington.

(5) The relation of wells and of the rights of the users thereof for irrigation in the State of Oregon, to the stream system and to the rights of lower diverters therefrom for lands in the State of Washington.

(6) The underground waters of the lands in the State of Oregon, and their relation to the supply of water in the stream.

[fols. 6 & 7] (7) The past and present use of water by diverters of water in Oregon as against diverters in Washington, and its relation to adverse use and estoppel, and the distribution of water in Oregon as a separate stream system.

III

As and when sufficient data is secured by the respective parties hereto, the issues in the matters enumerated in Subdivisions (1) to (7) of the foregoing paragraph shall be more specifically stated and defined, in statements to be filed herein and furnished opposing counsel, and, as far as possible, eliminated by additional stipulations of counsel.

Dated at Walla Walla, Washington, this 21st day of October, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Att'y Gen of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 8] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 2—RELATING TO DECREES AND PERMITS, ETC.

It is hereby agreed that the following is a true statement of the description of the stream system of the Walla Walla River, together with an agreement as to the settlement of certain rights and the elimination of certain streams from the issues of this case, towit:

I

The Walla Walla River rises in the western slopes of the Blue Mountains in Northeastern Oregon. Two branches, called the North Fork and the South Fork, unite about four miles above the city of Milton. From this point the river flows through a narrow irrigated valley, approxmately one-half mile wide, until it reaches Milton, where the river divides in a delta formation. The pipe line of the city of Milton diverts water from the South Fork at a point in the Southeast quarter of the Southeast quarter of Section 22, Twp. 5 North, Range 36 E. W. M., and furnishes water for its power plant, which is located in the Northwest quarter of the Southwest quarter of Section 18, Twp. 5 North, Range 36 E. W. M. Couse Creek, flowing from the west, enters the main stream a short distance [fol. 9] above the city of Milton and just below the city's hydroelectric power plant.

The delta formation comprises lands in Sections 12, 1, 2 and 3, Twp. 5 North, Range 35 E. W. M., and in Sections 34, 35, 36, 25, 26 and 27, Twp. 6 North, Range 35 E. W. M.

The first division of the stream in this delta formation is immediately below the bridge crossing the river in the Southwest quarter of the Northeast quarter of Section 12, Twp. 5 North, Range 35 E. W. M. At this point the stream divides into the Little Walla Walla and the Tumalum (as called in Oregon) or Main Walla Walla (as called in Washington).

The Little Walla Walla in turn, after flowing a distance of about a mile, at a point in the Northeast quarter of Section 2, Twp. 5 North, Range 35 E. W. M. (called locally "The Frog"), divides into the Ford Branch and the Crocket Branch. It is at this point that the water is measured into

the ditch of the Milton, Freewater & Hudson Bay Irrigation Company.

The Crocket Branch, immediately below, divides into the East and West branches of the Crocket, and the West branch of the Crocket divides into three prongs. The two easterly of these prongs join, about a mile and a half below, the East branch of the Crocket, and discharge into the East Prong of the Little Walla Walla Spring Branch, which in turn empties into the East Little Walla Walla River across the line in the State of Washington. The East Little Walla Walla River discharges into the main stream near the Northeast corner of Section 10, Twp. 6 North, Range 35 E. W. M., in the State of Washington.

The several prongs of the West branch of the Crocket, which unite in the Northeast quarter of Section 26, Twp. 6 North, Range 35 E. W. M., with the East branch of the Crocket to form the East Prong of the Little Walla Walla River Spring Branch, contribute little, if any, water to this Spring Branch during the irrigation season.

[fol. 10] Beginning in Sections 23 and 24, Twp. 6 North, Range 35 E. W. M., there are numerous springs which supply the water during the irrigation season to this East prong Spring Branch, Ballou Spring Creek, Big Spring Branch and Grandview Creek, which form the East Little Walla Walla River in Washington.

Lewis Spring Branch rises to the west of these springs in the Southeast quarter of the Southwest quarter of Section 23, Twp. 6 North, Range 35 E. W. M., in the State of Oregon. Its waters are all diverted for irrigation during the irrigation season. The natural drainage of the lands watered from the Lewis Spring Branch is toward the Northwest. These waters come to the surface in a spring arising just across the line in the State of Washington. This spring forms the beginning of Walsh Creek in that state.

The Westerly prong of the West branch of the Crocket unites with the Ford branch at a point in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla, which crosses the line into the State of Washington, where it is known as the West Little Walla Walla River. The West Little Walla Walla River empties into the main stream in Section 31, Twp. 7 North, Range 35 E. W. M., in the State of Washington, below the intake of the canal of the Gardena Project.

The Westerly prong of the West branch of the Crocket unites with the Ford branch in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla. These two branches, however, furnish little, if any, water to the West prong during the irrigation season. Springs in and near the channel of the West prong constitute substantially its only supply of water during the irrigation season.

West of the center line of Sections 22 and 27, Township 6 North, Range 35 E. W. M., rises the East branch of Mud Creek and the Middle Branch of Mud Creek, which unite to [fol. 11] form Mud Creek in Washington, which flows into the Walla Walla River in Section 36, Twp. 7 North, Range 33 E. W. M.

Further west is South Mud Creek, Schwartz Spring Branch and Dry Creek, which are tributaries of Pine Creek. South Mud Creek crosses the State Line North of Section 15, Twp. 6 North, Range 34 E. W. M., and flows westerly in the State of Washington about a quarter of a mile from the State Line to Pine Creek. It is known as Little Mud Creek in the State of Washington. Pine Creek enters the main stream in Section 2, Twp. 6 North, Range 33 E. W. M., below all the diversions on the main stream involved in these proceedings. Johnson Creek, Goodman Spring Branch and Dugger Creek are spring branches in Oregon in the water shed of Pine Creek, but have no surface channel connection therewith.

Birch Creek rises in the State of Oregon and flows Northwesterly and Westerly not far from the State Line, until a short distance from the main stream, where it turns northerly, crosses the line, and enters the main stream in Section 13, Twp. 6 North, Range 35 E. W. M., in the State of Washington just North of the State Line.

Shortly after passing the line into the State of Washington, the main stream turns and flows through wide valleys in a Westerly direction a distance of approximately thirty miles, where it empties into the Columbia River, near Wallula.

The principal tributary of the main stream in the state of Washington is Mill Creek, which also rises in the Blue Mountains in the State of Oregon. None of the waters of the water shed of this tributary reaches the main stream in the State of Oregon. Approximately twelve miles above

the confluence of Mill Creek with the Walla Walla River, the tributary divides, one branch forming Yellowhawk Creek. Yellowhawk Creek, in turn, divides, one branch forming Garrison Creek. The courses of Yellowhawk Creek and Garrison Creek diverge for a ways, then run nearly parallel in a Southwesterly direction to the main stream, Garrison Creek entering the main stream in the Northeast [fol. 12] quarter of the Southeast quarter of Section 4, Twp. 6 North, Range 35 E. W. M., and Yellowhawk Creek entering the same in the Northeast quarter of the Northwest quarter of Section 11, Twp. 6 North, Range 35 E. W. M. The intake of the Gardena Project is located on the main stream between the two points.

Garrison Creek has no tributaries, except a few inconsequential spring branches.

Cottonwood Creek, Russell Creek and Lasater Spring Branch are tributaries of Yellowhawk; the lower of these tributaries entering the same about one mile and a half above its mouth. Reser Creek in turn is a tributary of Russell Creek. About a mile and a half above the Yellowhawk division, Mill Creek divides, one branch being Titus Creek, which parallels and then unites with Mill Creek about a mile below the Yellowhawk division. Mill Creek runs through the city of Walla Walla and enters the main stream near the Whitman Mission, in Section 31, Twp. 7 North, Range 35 E. W. M.

At the point of the Yellowhawk division of Mill Creek, controlling works have been constructed and the waters of Mill Creek are apportioned between the two streams, in accordance with the priorities of the rights of persons entitled to water from the two streams, except rights in lower Mill Creek, below the Southeast quarter of the Southeast quarter of Section 23, Twp. 7 North, Range 35 E. W. M., which for practical purposes are administered independent of the rights on the upper portion of the stream above that point.

Stone Creek is a tributary of the main stream, entering the same below Yellowhawk in the Southwest quarter of Section 3, Twp. 6 North, Range 35 E. W. M. and below the intake of the canal of the Gardena Project. Doan Creek is a tributary of lower Mill Creek and enters the same in the Northwest quarter of the Northwest quarter of Section 32, Twp. 7 North, Range 35 E. W. M. The Touchet River is a

tributary of the main stream, entering the same in Section 4, Twp. 6 North, Range 33 E. W. M. McEvoy Spring Branch enters the main stream in the Southwest quarter of [fol. 13] Section 3, Twp. 6 North, Range 35 E. W. M., above the intake of the canal of the Gardena Project. There are other spring branches entering the stream which are too inconsequential to mention specifically. Yellowhawk Creek, East Little Walla Walla River, McEvoy Spring Branch and Birch Creek are the only tributaries entering the main stream in the State of Washington above the intake of the canal of the Gardena Project.

II

It is further hereby stipulated and agreed that:

(1) As to the rights between the two states in the instant case, the rights of the City of Walla Walla to the waters of Mill Creek for municipal and other beneficial purposes shall be construed to be a right for 28 cubic feet per second of time, with a priority date of 1866.

(2) Attalia Irrigation District No. 1 has a right to the return waters of the lower Walla Walla River, with a diversion point located near the East line of Section 22, Twp. 7 North, Range 32 E. W. M. This right, under the provisions of the decree in the adjudicated case of State vs. Achermann, No. 19075, Superior Court of the State of Washington, Walla Walla County, does not run against the rights of the water users of the upper valley, and such provisions of said decree shall apply in favor of the water users in Oregon, and the rights of said district are not involved in the instant case.

(3) Touchet River, in Washington, and Goodman Spring Branch, Dugger Creek and Johnson Creek, in Oregon, are not interstate streams, and the rights to the use of the waters thereof are not involved in any issue in this case.

(4) The rights to the use of the waters of Mud Creek and its tributaries, towit, East Branch of Mud Creek and Middle Branch of Mud Creek, and of Pine Creek and its tributaries, towit, South Mud Creek (known as Little Mud in Washington), Schwartz Spring Branch and Dry Creek, together with any other tributaries of the foregoing named streams, [fols. 14 & 15] are hereby established, and shall be adminis-

tered, and the water shall be distributed to such rights, in accordance with the decrees of the courts of the two states and the permits for the appropriation of water issued by authority of the two states, in the same manner as if the State line did not exist, and there are no issues herein in respect thereto.

Dated at Walla Walla, Washington, this 21st day of October, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Atty. General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

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[fol. 16] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 3—STATEMENT OF FACTS

The following statement of facts is hereby stipulated and agreed upon by counsel for the respective parties, as follows:

I

Land Forms, Drainage and Climate

(Based largely on the report of A. M. Piper)

The Walla Walla Basin is part of a plateau extending from the Columbia River to the Blue Mountains. The western edge of the adjacent Blue Mountain section is about 10 miles East of the city of Walla Walla. This plateau has moderate relief, ranging from 1900 feet elevation along the flank of the Blue Mountains to 400 feet in the river bottoms at the Western edge of the area. The only extensive flat areas are the flood plains and terraces developed by the larger streams. For the most part the upland areas comprise sub-parallel ridges tending North 20 degrees East, separated by V-shaped valleys which commonly are 50 to

300 feet deep. These ridges and slopes have a deep fertile soil. The Walla Walla Valley is rudely triangular, and from apices in the canyons of Mill Creek and the Walla Walla River, converges westward to the head of the gorge [fol. 17] which begins 20 miles to the West. Near Whitman, where the Walla Walla River and Mill Creek join, the valley is ten miles wide. At Touchet it is about four miles in width. The valley comprises three distinct physiographic divisions. In order of decreasing age, these are: the Gardena terrace, whose remnants in places are as much as 120 feet above the flood plains of the river; the Low terrace, whose remnants parallel the flood plains and are commonly less than 20 feet above them; and finally the alluvial fans of the Walla Walla River and of Mill Creek and the flood plains of the river and its tributaries.

The Gardena terrace is now thoroughly dissected, and is represented by numerous remnants, which range in size from flats 18 miles in length to hillocks 100 yards across. The most prominent remnant lies south of the Walla Walla River, in the Western part of the area upon which is situated the Gardena irrigated district, from which this land form is named. This remnant in places stands 120 feet above the flood plain of the river, southeast of Touchet, and 40 feet above the flood plain of Dry Creek in Oregon, 10 miles to the East. The remnant flanks the Southern wall of the valley for a distance of 12 miles. The larger remnant of the Gardena terrace lies North of Walla Walla. In the central plain of the basin the terrace has been thoroughly dissected by the several distributaries of the Walla Walla River and Mill Creek, which have left long narrow remnants. In general the gradient of the Gardena terrace is slightly less than that of the adjacent flood plain. Remnants in the flood plain of the area are 100 to 120 feet above the flood plain, and slope westward less than 20 feet to the mile. Those in the Eastern part of the area stand only 10 to 25 feet above the fans of the Walla Walla and Mill Creek, and decline westerly 60 to 75 feet in a mile.

The Low terrace is inconspicuous and is represented by remnants less than one mile wide and as much as 8 miles long, and which border the flood plains. Remnants of the Low terrace are readily discernible in the Western part of the area, where they are 5 to 20 feet above the flood plain. [fol. 18] Upstream they become lower and less discernible

and commonly merge into the flood plain without any topographical break.

The alluvial fan of the Walla Walla River slopes North from an apex at the mouth of the rock-walled canyon at Milton, and is about 4 miles long and 4 miles wide along the outer margin. At its apex the fan is about 1,070 feet above sea level. From this altitude it descends about 60 feet to the mile and stands about 850 feet above sea level at its outer margin. This feature is delimited to the North and West by the upstream ends of the several remnants of the Gardena and Low Terraces. The Walla Walla River, commonly called the Tumalum, follows its East margin. Below the fan the Walla Walla River and its several distributaries have developed flood plains which generally are less than 0.5 miles wide and which are separated or bordered by long narrow remnants of the Low terrace or by higher remnants of the Gardena terrace. The alluvial fan of Mill Creek is less prominent than the fan of the Walla Walla at Milton. This fan originates at an apex about 2 miles east of Walla Walla and is roughly relimited by Yellowhawk Creek on the South, by the main channel of Mill Creek on the North, and by several narrow remnants of the Gardena terrace on the West. The maximum width of one and a half miles is attained at Walla Walla. Both above and below the fan, the flood plain of Mill Creek averages 0.5 miles wide. The gradient of the Walla Walla River decreases progressively downstream. At the junction of the canyons of the North and South forks it is about 80 feet in a mile. Across the fan North of Milton the average slope is about 60 feet in a mile. At Whitman, in the central part of the valley, the slope is 40 feet to the mile, and further downstream, between Touchet and the head of the gorge, it becomes less than 10 feet to the mile. The Walla Walla River drains about 150 square miles above Milton, its drainage area being moderately rugged and moderately high in altitude. Little rain falls on the drainage area in the summer, and a large part [fol. 19] of the precipitation in the winter is snow. Under these conditions, the stream is subject to an annual spring freshet and is flashy throughout the year.

The gradient of Mill Creek is about 100 feet to the mile at the mouth of the canyon, 65 feet to the mile at Walla Walla, and 50 feet to the mile near Whitman, which is just above its junction with the Walla Walla River.

The Walla Walla Basin has a semi-arid climate, with warm, dry summers and cold wet winters. The mean temperature in the warmest month, which is generally July, is 73.9 deg. F. at Milton, 76.5 deg. F. at Walla Walla, and 72.8 deg. F. at Lowden. In the coldest month, which generally is January, it is 31 deg. F. at Milton, 30.9 deg. F. at Walla Walla, and 29.1 deg. F. at Lowden. The mean annual temperature is 52.6 deg. F. at Milton, 53.9 deg. F. at Walla Walla, and 51.3 deg. F. at Lowden. During the past ten years, the highest recorded temperature was 107 deg. F. and the lowest was —15 deg. F. During the same period, the latest killing frost in the spring has ranged from March 9th to May 9th, and the earliest killing frost in the autumn from September 21st to November 12th. The average growing season, or frost-free period, is 193 days. The average annual rainfall at Milton, during the 11 year period 1922-1932, was 12.99 inches, of which 1.54 inches fell during the three summer months, July, August and September. The average annual rainfall at Walla Walla during that period was 14.37 inches, of which 1.64 inches fell during the three summer months. The average annual rainfall at Lowden, during the same period, was 9.52 inches, of which 1.25 inches fell during the three summer months.

## II.

## Irrigation Practices.

The growing season in the Walla Walla Basin extends from April to October, inclusive. Irrigation during this growing season is called herein summer irrigation, and irrigation during any other part of the year is herein called winter irrigation. Winter irrigation is practiced on the [fol. 20] lands served by the Milton, Freewater & Hudson Bay Irrigation Company, and on some of the lands of the Gardena project. The balance of the Walla Walla Basin is served by summer irrigation. In all cases where the water supply is not sufficient to supply water during the entire growing season, the practice is to store water in the soil, where possible, by irrigation prior to the growing season and whenever water is available. In summer irrigation of orchards, alfalfa and grain, outside of the gravelly soil, the practice is to apply water about once every two weeks. In areas of gravelly land, the practice is to apply water to such crops once a week. In the gravelly soil in and around

Milton and Freewater, for strawberries, tomatoes, garden vegetables and short-rooted crops, the practice is to apply water two to three times a week. Where the application is made several times a week, the period of application is from two to four hours each time. Where it is once a week, the time of application is from eight to twelve hours. Where application is made at longer intervals, the length of time depends upon the amount of acreage, and in most cases a continuous flow to each irrigator is used. The flooding method of irrigation is not practiced. Nearly all the irrigation is by what is known as the corrugation method.

It is the general practice in the orchards to grow cover crops of clover, alfalfa and the like, as a protection against evaporation. These crops are usually chopped into the soil as fertilizer.

Controlling works are found at the principal points of diversion from the stream. Weirs for measuring undividual rights are in general use throughout the valley.

Rotation is practiced to a considerable extent. In Oregon, in the deep soils, the rotation period is from one to two weeks for alfalfa and grain. In the gravel soils, for orchards and alfalfa, the average irrigated acreage for a group of rotaters is about 60 acres, and rotation is practiced on a weekly basis. Where the gravel soil about Milton and Freewater is cultivated to strawberries, tomatoes, vegetables and short rooted crops, the average irrigated [fol. 21] acreage for a group of rotaters for such crops is from 10 to 20 acres and rotation is practiced on both a twice a week and a thrice a week basis. Rotation under the Oregon decrees may be enforced by the water master, and in some instances is carried out by agreement of the parties. In Washington, rotation is practiced under all ditches operated by irrigation districts, and in the vicinity of Walla Walla, by private arrangement between the individual water users. The period of rotation varies greatly, but averages, it is estimated, about ten days.

In some instances there is a run-off from the irrigated lands, caused by the use of a large head of water. This run-off, locally called waste water, is utilized on succeeding tracts.

In the section around Milton and Freewater, there are approximately 300 wells, which pump water from the lower

gravel strata and apply it to irrigation. In Washington there is little irrigation from wells.

## III.

## Crop Production

Oregon.—In Oregon the crops consist of wheat, alfalfa hay, prunes, apples, cherries, tomatoes, berries, vegetables and nursery stock. In the irrigated section there are from 3000 to 4000 acres of prunes, yielding about 6 tons to the acre; from 1000 to 1800 acres of apples, yielding about 8 tons to the acre; 200 to 300 acres of cherries, yielding about 4 tons to the acre; about 200 acres of tomatoes, yielding 10 tons to the acre. (The acreage of tomatoes has been cut down this year from past years, in accordance with the general policy of cutting the amount of production. Last year the acreage was about 300 acres.) There are about 125 acres of berries, yielding about a ton to the acre. Nursery stock of about 175 acres supplies about 40 carloads per year, besides the local market. Alfalfa hay is raised on from 2000 to 2500 acres of land, and yields from 5 to 7 tons per acre, depending on the length of time that water [fol. 22] is available for irrigation. In this district there are approximately 2500 dairy cattle, exclusive of those kept for family purposes only. In the line of vegetables, squash, melons, potatoes and other varieties yield in proportion to the tomatoes. There has also developed a considerable flower trade. A number of growers specialize in peonies, supplying the trade not only with peony blooms but with the plants.

Washington.—The crops of the valley in Washington consist principally of alfalfa, wheat, vegetables and fruits. It is estimated that 40,000 tons of alfalfa are raised in this area annually. The average acreage yield is 6 tons. Wheat on irrigated land is generally raised as part of the rotation between alfalfa plantings. It is estimated that 1000 acres of wheat are irrigated in this area annually. The average acreage yield is 50 bushels. Crops of vegetables are grown quite extensively. The average annual yield of the following varieties is: Head lettuce, 49 cars; cabbage, 16 cars; rhubarb, 35 cars; onions, 300 cars; spinach, 100 cars; tomatoes, 30 cars; cantaloupes, 46 cars; potatoes, 307 cars; mixed vegetables, 84 cars. The average acre yield of the

following varieties is: Asparagus, 500 boxes to the acre; spinach, 500 boxes per acre; onions, 600 sacks per acre; potatoes, 200 sacks per acre. Fruits are also grown in this area. In 1932, 125 cars of apples and 302 cars of prunes were estimated to have been shipped out of Walla Walla. Apples in this territory yield from 5 to 10 boxes per tree. Prunes yield as high as 600 boxes to the acre. The sweet varieties of cherries are grown, yielding as high as 100 pounds to the tree. It is estimated that 145 tons of cherries were raised in 1929. Peaches and pears are grown successfully, principally fo the local market. 16 tons of peaches were raised in 1929. An average of 10 cars of grapes are shipped from Walla Walla annually. Strawberries yield as high as 600 crates to the acre. Approximately 100 acres in this area are devoted to berry culture. It is estimated that there are 4000 milk cows on the farms in this area. Two and three-quarter million gallons of milk were pro- [fol. 23] produced in 1929. Poultry is also raised extensively. 7500 turkeys, 1600 ducks and 1000 geese were estimated to have been raised in this area in 1929. $47,000.00 was also realized from the sale of chickens in that year.

## IV

### Development of Community

Oregon.—The Oregon community supports a flour mill, a sawmill and box factory, cider works, a dehydrating plant and a vinegar plant, in addition to a number of commission houses and fruit and vegetable distributors. In order to handle the fruit and vegetable crops, five cold storage houses have been erected and are operated by the various companies.

The district contains ten grade schools, having a total of about 1000 pupils, and a splendid Union High School. There are about ten churches. This property, together with the municipal buildings of the two towns, represents a value of about half a million dollars.

Washington.—In the city of Walla Walla there are 66 manufacturing plants, including four flour and feed mills, a meat packing house, a cannery, specializing in vegetable canning, three creameries, an iron products foundry, two sash and door factories, a concrete pipe and conduit plant,

and other small manufacturing enterprises. The annual value of the products of these industries is $6,279,166.00.

The city of Walla Walla supports a high school, six grade schools, three parochial schools, three music schools and two colleges, with an aggregate average annual attendance of 5300 students. There are twenty-four churches, representing all principal denominations, four theatres and three hospitals. Grade schools and churches exist and are well distributed outside the city in this area.

[fol. 24]

## V

### Population, Farm Acreage and Assessed Valuation

The territory herein considered excludes all that part of the river basin which by stipulation has been heretofore removed from any issue in the case.

Oregon.—The related territory in Oregon, excluding the Hudson Bay lands, has a population, according to the 1930 census, of 4772, of which 2308 is urban, being the cities of Milton and Freewater, and 2464 is rural. In addition, the Hudson Bay lands are occupied by about 65 families, which would raise the total population of the district to about 5000.

The irrigated lands are farmed intensively. The 6233.87 acres irrigated from the Walla Walla River, spring branches and East Prong of the Walla Walla, are divided into 889 farms, with an average acreage of 7.01 acres. The West Prong and Lewis Spring Branch have 618.74 acres, divided into 36 farms with an average acreage of 17.19. The Pleasantview Ditch Company irrigates 1249.18 acres, divided into 62 farms with an average acreage of 20.15. The Milton, Freewater & Hudson Bay Irrigation Company irrigates 2675.41 acres, divided into 57 farms, with an average acreage of 47 acres. This makes a total acreage in the related area of 10,777.20, divided into 1044 farms, or an average acreage of 10.32 acres.

This acreage has an assessed valuation, on the 1932 roll, exclusive of the Hudson Bay acreage, of $1,543,120.00. The Beauchamp land, of 86.67 acres, irrigated under the Hudson Bay, is assessed at $11,810.00, and the Markham land, 200 acres, is assessed at $21,560.00. Based upon these

assessments, it is estimated that the assessed value of the Hudson Bay lands is substantially $250,000.00. The assessed valuation of the cities of Milton and Freewater is $915,975.00. This makes a total assessed valuation of the related district of $2,709,095.00. The assessed valuation is usually counted as averaging about fifty per cent of the actual value.

[fol. 25] Washington.—The related territory in Washington, outside the incorporated towns, has a population of 7090, according to the 1930 U. S. census. The population of the city of Walla Walla, according to the same authority, is 15,976. There are 9615 acres of irrigated land in the vicinity of Walla Walla. The size of the farming units in this area varies from 1 to 500 acres. The average is 17 acres. In the vicinity of Lowden there are 3231 acres, ranging in size of unit from 2 to 160 acres, with an average of 38 acres. In the Gardena district, the smallest unit is 4 acres, the largest 200 acres, and the average 70 acres.

The above described acreage in the vicinity of Walla Walla has an aggregate assessed valuation, on the 1932 tax roll, of general taxes, of $3,845,942.00. The assessed valuation of lands in the city of Walla Walla for the same year is $8,137,409.00. In the vicinity of Lowden, lands were assessed for the same year at $225,670.00, and in the Gardena District, at $234,663.00. The total aggregate assessed valuation of the land in the related area is $12,443,684.00. Under the law in the State of Washington, lands are assessed for taxation purposes at fifty per cent of their actual value.

[fol. 26] Priorities and Approximate Acreages, As Shown By Decrees and Permits

The following tabulation shows the approximate acreage under each year's date of priority, as shown by the several decrees of the two states, for the related area, excluding all that part of the river basin which by stipulation has been heretofore removed from any issue in the case, and including the Gardena appropriation, the priority of which is contested by Oregon and reserved for further hearing.

| Year | Oregon | | | Washington | | |
|---|---|---|---|---|---|---|
| | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1859 | ..... | ..... | ..... | ..... | 37.15 | ..... |
| 1861 | ..... | ..... | ..... | ..... | 314.00 | ..... |
| 1862 | 35.84 | ..... | ..... | ..... | ..... | ..... |
| 1863 | ..... | ..... | ..... | ..... | 83.50 | ..... |
| 1864 | 38.22 | ..... | ..... | ..... | 81.61 | ..... |
| 1865 | 37.12 | ..... | ..... | ..... | 124.23 | ..... |
| 1866 | 3.30 | ..... | ..... | ..... | 137.13 | ..... |
| 1867 | 8.24 | ..... | ..... | ..... | ..... | ..... |
| 1868 | 60.28 | ..... | ..... | ..... | 89.90 | ..... |
| 1869 | 4.18 | ..... | ..... | ..... | 44.45 | ..... |
| 1870 | 47.31 | ..... | ..... | 160.00 | 85.83 | ..... |
| 1871 | 11.06 | ..... | ..... | ..... | ..... | 35.00 |
| 1872 | 55.78 | ..... | ..... | ..... | 79.75 | ..... |
| 1873 | 65.50 | ..... | ..... | ..... | 13.00 | ..... |
| 1874 | 25.26 | ..... | ..... | ..... | ..... | ..... |
| 1875 | 291.47 | ..... | ..... | ..... | 20.40 | ..... |
| 1876 | 72.90 | 15.00 | ..... | ..... | 1.32 | ..... |
| 1877 | 87.73 | ..... | ..... | ..... | 12.00 | ..... |
| 1878 | 81.74 | ..... | ..... | ..... | 54.77 | ..... |
| 1879 | 31.55 | ..... | ..... | ..... | ..... | ..... |
| 1880 | 180.17 | ..... | 43.80 | ..... | 25.20 | ..... |
| 1881 | 123.46 | ..... | 7.50 | ..... | 51.50 | ..... |
| 1882 | 86.90 | ..... | ..... | ..... | 91.00 | ..... |
| 1883 | 55.09 | ..... | 13.00 | ..... | 61.73 | ..... |
| 1884 | 16.50 | ..... | ..... | 125.00 | 149.48 | ..... |
| 1885 | 135.35 | ..... | 14.00 | ..... | 94.88 | ..... |
| 1886 | 54.51 | ..... | 32.00 | ..... | 141.35 | 20.00 |
| 1887 | 217.76 | ..... | ..... | ..... | 30.50 | ..... |
| 1888 | 93.38 | ..... | ..... | ..... | ..... | ..... |
| 1889 | 65.86 | ..... | ..... | ..... | 98.91 | 462.90 |
| 1890 | 113.72 | 10.00 | 60.29 | ..... | 48.50 | ..... |
| 1891 | 131.49 | ..... | ..... | ..... | 178.67 | 29.00 |

| Year | Oregon | | | Washington | | |
|---|---|---|---|---|---|---|
| | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1892 | 264.05 | 10.00 | 15.00 | 8,221.11 | 647.63 | ..... |
| 1893 | 157.54 | ..... | 9.75 | 431.96 | 18.00 | ..... |
| 1894 | 102.12 | ..... | 82.00 | ..... | 477.97 | 187.70 |
| [fols. 27 & 28] | | | | | | |
| 1895 | 242.07 | ..... | 75.50 | ..... | 246.75 | ..... |
| 1896 | 30.72 | ..... | ..... | 180.79 | ..... | 65.00 |
| 1897 | 128.31 | ..... | 10.50 | ..... | 141.25 | ..... |
| 1898 | 44.37 | ..... | 9.50 | ..... | 160.00 | ..... |
| 1899 | 7.06 | ..... | ..... | ..... | 6.50 | ..... |
| 1900 | 198.99 | ..... | 50.00 | ..... | 99.33 | ..... |
| 1901 | 87.69 | 49.90 | 11.00 | ..... | 105.45 | 1.00 |
| 1902 | 165.90 | 33.90 | 72.00 | ..... | 38.00 | 52.00 |
| 1903 | 2,725.04 | 15.30 | 7.50 | 40.00 | 147.06 | ..... |
| 1904 | 23.02 | 8.70 | 14.50 | 330.00 | 884.58 | ..... |
| 1905 | 136.35 | 12.80 | ..... | ..... | 25.05 | 10.00 |
| 1906 | 40.06 | ..... | 16.00 | ..... | 123.75 | ..... |
| 1907 | 80.99 | 8.75 | 7.00 | 50.00 | 153.15 | ..... |
| 1908 | 193.82 | 38.84 | 16.70 | ..... | 202.55 | 106.00 |
| 1909 | 316.71 | ..... | ..... | ..... | 42.00 | ..... |
| 1910 | 33.25 | ..... | ..... | ..... | 32.28 | ..... |
| 1911 | ..... | ..... | ..... | ..... | 50.00 | ..... |
| 1912 | 962.14 | ..... | ..... | 15.00 | 371.00 | ..... |
| 1913 | 392.25 | ..... | ..... | ..... | 83.19 | ..... |
| 1914 | 14.00 | ..... | ..... | ..... | 136.50 | ..... |
| 1915 | 97.00 | ..... | ..... | ..... | 63.10 | ..... |
| 1916 | 28.80 | ..... | ..... | ..... | 0.40 | 33.00 |
| 1917 | 59.00 | ..... | ..... | ..... | 63.28 | 21.00 |
| 1918 | 28.00 | 8.00 | ..... | ..... | 49.90 | ..... |
| 1919 | 59.00 | ..... | 9.25 | 5.00 | 29.00 | 35.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1920 | 27.50 | 15.00 | 32.00 | 50.00 | 61.74 | 32.00 |
| 1921 | 12.00 | ..... | ..... | ..... | 75.52 | ..... |
| 1922 | 140.00 | 113.00 | ..... | ..... | 3.60 | ..... |
| 1923 | 140.00 | 37.00 | ..... | ..... | 11.00 | ..... |
| 1924 | 91.00 | 5.00 | ..... | 35.00 | 6.00 | ..... |
| 1925 | 41.00 | 25.00 | ..... | ..... | 0.50 | ..... |
| 1926 | 3.50 | ..... | 10.00 | 880.00 | 1,419.80 | 49.00 |
| 1927 | 90.40 | ..... | ..... | 15.00 | ..... | ..... |
| 1928 | 281.15 | ..... | ..... | ..... | 25.00 | ..... |
| 1929 | 30.00 | ..... | ..... | ..... | 7.50 | ..... |
| 1930 | 44.80 | ..... | ..... | ..... | ..... | ..... |
| 1931 | 1.00 | ..... | ..... | ..... | ..... | ..... |

Dated at Walla Walla, Washington, this 10th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Assistant Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

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[fol. 29] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 4—RELATING TO CERTAIN EVIDENCE

It is hereby stipulated by and between the undersigned counsel for the respective states:

I. That the simplified soil map prepared by Mr. Youngs of the U. S. G. S., with reference to susceptibility to irrigation, showing the areas of the different classes of soils, is hereby adopted as being a correct representation of the classifications and of the areas of the several classes of soil, and that the symbols indicated thereon shall have the meaning as shown by the key attached to said map, and that said map and key shall be identified by the signature of an attorney representing each of the parties hereto, and that thereafter said map and key so identified shall be filed with the Special Master in this case and may be introduced in evidence without further identification.

II. That the report of A. M. Piper, T. W. Robinson and H. E. Thomas, of the U. S. G. S., upon their study of the ground water of the Walla Walla Basin, Oregon and Washington, with appendices, released October 30th, 1933, or any part of the same, may be introduced in evidence by either party hereto without further identification.

[fols. 30-31] III. That the general map of the Walla Walla Basin, heretofore filed, approved by C. E. Stricklin, State Engineer of the State of Oregon, and Chas. J. Bartholet, Supervisor of Hydraulics of the State of Washington, is

hereby adopted as the official map, and may be introduced in evidence without further identification.

IV. That the statutes and constitution of either the State of Oregon or the State of Washington may be submitted in evidence or in argument by reference to the official codes and session laws of the respective states; that the court decisions of either state may be cited by counsel in support of the points contended for, by reference to the state reports and accepted publications of the decisions of the Supreme Courts of the respective states.

Dated at Walla Walla, Washington, this 10th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Assistant Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

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[fol. 32] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 5—STATEMENT OF AGREED FACTS

The largest diversion from the Walla Walla River in the

The following facts are hereby stipulated and agreed: State of Washington is for lands served by the Gardena Farms District Canal, formerly Walla Walla Irrigation Company Canal. At a point approximately twelve and a half miles West of the diversion point and in the SW¼ of the NW¼ of Section 5, Twp. 6 North Range 34 E. W. M., the canal enters a syphon, through which it crosses Pine Creek Valley and emerges therefrom in the NE¼ of the SE¼ of Section 12, Twp. 6 Range 33 E. W. M.

By decree in the Superior Court of the State of Washington for the County of Walla Walla, in the case of State of Washington, plaintiff, vs. Charles Achermann et als., defendants, No. 19075, the Walla Walla Irrigation Company, under Proof No. 570, was given a right from the Walla

Walla River, by appropriation under a priority date of [fol. 33] 1892, to irrigate 7000 acres of land with a maximum amount of water of 93.333 c. f. s. from April 1st to July 1st, and 70 c. f. s. of water from July 1st to October 1st, subject to the following note:

That claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the referee, to-wit, on the 29th day of March, 1926, is entitled to use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st; 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said lands may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics.

A certificate of water right issued under said decree is hereto attached, made a part hereof and marked Exhibit "A".

In the year 1928, an irrigation district was formed, known as the Gardena Farms District, which acquired the rights of the Walla Walla Irrigation Company.

In the beginning, J. F. Boyer, T. J. Kirk and W. F. Courtnay caused preliminary surveys to be made and a canal route to be located. Several notices of appropriation were posted at the proposed point of diversion and recorded in the office of the proper recording officer of Walla Walla County, State of Washington, copies of which, with dates of record, are hereto attached, made a part hereof and marked Exhibit "B", "C" and "D" for diversion from the Walla Walla River, and Exhibit "E" for diversion from the Little Walla Walla River. No diversion was ever made from the Little Walla Walla River.

[fol. 34] In th spring of 1892, E. C. Burlingame, a contractor, became interested in the project and made further

surveys and investigations of the route of the canal, and thereafter acquired an interest therein.

Soon thereafter in the same year a corporation was formed, known as the Walla Walla Irrigation Company. On November 5, 1892, formal conveyances of the rights of the individual appropriators were made to the Company, by deed recorded January 24, 1893, in Book 53, at page 179, Deed Records of Walla Walla County, Washington.

Mr. Burlingame performed the construction work for the Company using his own equipment and teams up to the time of the formation of the irrigation district which succeeded to the rights of the company in 1928.

In August 1892 actual construction work on the canal was begun.

Prior to the year 1905 the canal was constructed from the diversion point in the McBean donation land claim in the SW¼ SW¼ Section 3, Twp. 6 North Range 35 E. W. M. along the route of the canal as shown on the official map herein, to a point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. where the map indicates that the canal divides. From said divisional point one division of the canal was constructed in a Southwesterly direction into the State of Oregon, and also from said divisional point, prior to the year 1905, one division was constructed in a Northwesterly direction along the route indicated on the map to a point in Section 5, Twp. 6 North Range 34 E. W. M. about a mile from the upper end of the syphon.

[fol. 35] In the winter and spring of the year 1905 an inverted syphon was constructed from a point in the SW¼ of the NW¼ of said Section 5, to a point in the NE¼ SE¼ of Section 12, Twp. 6 North Range 33 E. W. M. from which point the distribution system for the irrigation of the lands West and South of the syphon was constructed and has been extended as the demands of irrigation required. This syphon has a head of 145 feet, carries the water of the canal across the valley of Pine Creek a mile and a half in width, and is built of wood staves and steel bands. It was originally of a diameter of 38 inches and has since been replaced by Gardena Farms District by one 44 inches in diameter.

For the first three miles of the course of the canal from the river the soil conditions presented no serious difficulties in construction. From there to the head of the syphon

the course of the canal was in light and ashy soil requiring the canal to be puddled and causing some breaks and slides. The excavation and filling was done with teams and scrapers.

As a part of this construction work there were cuts two of which were approximately 26 feet in depth at their deepest point, one about 1500 feet and the other about 1000 feet, in length. Some fills also had to be made. The canal was constructed 16 feet on the bottom from the diversion point to the division of the canal at the point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. and from that point to the head of the syphon is now 10 feet on the bottom, all with side slopes of 1½ to 1 and with a depth of about 6 feet. The canal has a fall of .5 of a foot to a 1000 feet and a capacity of 150 c. f. s. in that portion with 16 foot bottom.

[fol. 36] The structures now on the canal from the intake to the main line syphon are as follows:

Concrete diversion dam.

Concrete head gates.

18 foot cippoletti wier at head of canal constructed of cedar lumber.

Six flumes constructed of cedar and fir lumber.

Five drops—four constructed of concrete and one of fir lumber.

Two check wiers—one constructed of concrete and one of cedar lumber.

27 bridges—one of concrete and remainder of fir timber.

Pine Creek waste way and regulating wier, constructed of concrete.

15 turn-out gates of wood and concrete.

15 cippoletti wiers at turn-out gates.

And from the main line syphon to the end of the system the structures are:

Main line syphon, one and one-half miles in length, diameter 44 inches inside, constructed of creosoted Douglas Fir wood staves and steel bands, having concrete intake and outlet works.

And in Gardena all the usual project structures, consisting of drops, bridges, turn-out gates, cippoletti wiers, check wiers and secondary syphons.

Such records of the Company as are available indicate that the following expenditures were made for construction purposes, to-wit:

| | |
|---|---|
| [fol. 37] 1891 there was expended the sum of | $868.60 |
| 1892 there was expended the sum of | 5587.59 |
| 1893 there was expended the sum of | 5144.20 |
| 1894 there was expended the sum of | 8210.14 |
| 1895 there was expended the sum of | 2793.07 |
| 1896 there was expended the sum of | 1161.19 |
| 1897 there was expended the sum of | 1575.31 |
| 1898 there was expended the sum of | 1712.78 |
| 1899 there was expended the sum of | 1744.75 |
| 1900 there was expended the sum of | 3905.77 |
| 1901 there was expended the sum of | 526.74 |
| 1902 there was expended the sum of | 1638.55 |
| 1903 there was expended the sum of | 17477.59 |
| 1904 there was expended the sum of | 1388.60 |
| 1905 there was expended the sum of | 44212.36 |
| 1906 there was expended the sum of | 13828.65 |
| 1907 there was expended the sum of | 8203.32 |
| 1908 there was expended the sum of | 15635.52 |
| 1909 there was expended the sum of | 24466.59 |
| 1910 there was expended the sum of | 41709.46 |
| 1911 there was expended the sum of | 14892.42 |
| 1912 there was expended the sum of | 152.55 |
| 1913 there was expended the sum of | 140.00 |
| 1914 and | |
| 1915 there was expended the sum of | 252.95 |
| 1917 there was expended the sum of | 1300.38 |
| 1920 there was expended the sum of | 5400.30 |
| 1924 there was expended the sum of | 1500.00 |
| 1925 there was expended the sum of | 1649.08 |
| Total | $227078.56 |

These expenditures are analyzed and segregated as shown by Exhibit "F" attached and made a part hereof. These payments by the Company were made as and when it had the money and do not necessarily represent the dates when the work was performed.

Such records of the Company as are now available do not segregate the cost of construction of the canal which began in the year 1900 and which was constructed from the

divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon.

In the year 1910 the Company entered into arrangements to receive sewage water from the City of Walla Walla [fol. 38] and during the years 1910, 1911 and 1912 expended $49,253.92 for concrete sewer pipe, $3954.02 for construction work, $1471.64 for engineering, and $1771.60 for rights of way, for the purpose of conveying such sewage water to the Company's canals. This water was used until the year 1924 when such use was discontinued and the works abandoned, with the exception of a small part of the concrete pipe used for a spillway from the canal. From about 1920 to 1924 the Company contracts for the sale of water contained the following clause: "It is understood that sewage water from the City of Walla Walla is part of said water supply."

In the year 1907 the Company expended $798.00 in investigation of reservoir sites. No reservoir has been secured. The Company also expended for the drilling of wells, the following sums: In 1905, $240.50; in 1909 $6155.50; and from 1910 to 1913 the sum of $441.25, and in 1924 and 1925 the sum of $3149.08, making a total of $9980.33 expended for work in an attempt to develop an additional water supply from wells, which was without result.

Water was first diverted from the river into the canal in the year 1893 for puddling purposes and turned out through the spillway into the West Little Walla Walla River. In the year 1898 water was first used for irrigation when 68 acres along the line of the canal were irrigated. In 1899, 20 additional acres were irrigated but these latter mentioned lands have since been abandoned. In 1901, 280 acres were irrigated in Oregon from the canal running from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon, and between 1901 and 1918, 72 additional acres in Oregon were irrigated from [fol. 39] the canal, but the irrigation of these lands was discontinued in 1919, when the Company abandoned the operation of this canal. These lands are now irrigated from the Milton-Freewater and Hudson Bay ditch. In 1898, 68 acres were watered from the canal; in 1899 20 acres additional were watered in Washington, which were later abandoned.

In 1904, 193 acres were watered from the canal in Washington, including the 20 acres above mentioned as later

abandoned. Approximately 1133.4 acres East of the syphon in Washington are now irrigated from the canal. The balance of the lands irrigated from the canal lie West and South of the syphon. Water was first ran through the syphon in 1905 and used for irrigation.

The following tabulation shows water contracts for irrigation, according to years sold by the Company up to 1930:

[fol. 40] Gardena Irrigation Company Rights Sold

| | | |
|---|---|---|
| | Year 1898 | |
| Tocher | 18–6–35 | 68.00 Acres |
| | Year 1899 | |
| Benson | ..... | 20.00 Acres (Abandoned in 1918) |
| | Year 1901 | |
| Burlingame | 24–6–34 | 280.00 Acres (Abandoned in 1918) |
| | Year 1904 | |
| Murray | 6–6–34 | 4.00 acres |
| J. Merry | 7–6–34 | 33.00 acres |
| Schaeffer | 5–6–34 | 68.00 acres |
| | Year 1905 | |
| White | Lot 36 | 8.95 |
| Elliott | " 37 | 13.32 |
| Scudder | " 38 | 11.72 |
| Scudder | " 40 | 11.48 |
| Scudder | " 41 | 7.22 |
| Scudder | " 42 | 8.43 |
| Stone | " 43 | 13.87 |
| Stone | " 44 | 7.64 |
| Stone | " 45 | 4.66 |
| Stone | " 46 | 10.14 |
| James | " 47 | 14.17 |
| Harmon | " 50 | 23.58 |
| Pribble | " 51 | 15.81 |
| Munroe | " 52 | 9.74 |
| Morrison | " 53 | 13.52 |
| Stone | " 54 | 7.58 |
| Stone | " 55 | 8.98 |
| Elliott | " 56 | 14.29 |
| Jones | " 57 | 9.70 |
| Hendricks | " 58 | 3.74 |
| Randall | " 59 | 6.49 |
| Hendricks | " 60 | 4.19 |
| Elliott | " 61 | 5.19 |
| Elliott | " 62 | 5.45 |
| Elliott | " 63 | 9.25 |
| Macumber | " 64 | 6.95 |
| Billups | " 65 | 10.07 |
| Billups | " 66 | 7.27 |
| Macumber | " 67 | 4.84 |
| Macumber | " 68 | 7.85 |
| Macumber | " 69 | 8.93 |
| Elliott | " 70 | 12.60 |
| Paul | " 71 | 10.89 |
| Leach | " 72 | 10.85 |
| Brooks | " 73 | 12.42 |
| Woeffler | " 74 | 6.45 |
| Anderson | " 75 | 8.22 |

[fol. 41] Gardena Irrigation Company Rights Sold

Year 1905

| Name | Description | | No. Acres |
|---|---|---|---|
| Carter | Lot | 78 | 10.32 |
| Benner | " | 79 | 5.20 |
| Whitehouse | " | 80 | 14.65 |
| Cox | N½ | 81 | 5.39 |
| Cox | S½ | 81 | 5.40 |
| Bean | | 82 | 9.49 |
| Riggs | N½ | 83 | 5.32 |
| Brower | S½ | 83 | 7.21 |
| Stone | | 84 | 7.71 |
| Riggs | | 85 | 14.28 |
| Horton | | 86 | 15.95 |
| Owens | | 89 | 14.49 |
| Riggs | | 90 | 17.04 |
| Elliott | | 92 | 12.76 |
| Thompson | | 93 | 8.92 |
| Critchfield | | 96 | 10.83 |
| Wegge | | 97 | 7.82 |
| Prindle | | 99 | 12.85 |
| Prindle | | 100 | 9.37 |
| Roberts | | 102 | 8.28 |
| Ring | | 105 | 26.41 |
| Provins | | 108 | 7.23 |
| Watson | | 112 | 10.42 |
| Algin | | 113 | 8.08 |
| Snyder | | 114 | 1.86 |
| Smith | | 131 | 4.48 |
| Marshall | | 132 | 5.40 |
| Harris | | 133 | 6.32 |
| Reynolds | | 134 | 6.01 |
| W. W. I. Co. | | 135 | 9.23 |
| W. W. I. Co. | Pt. | 136 | 11.63 |
| W. W. I. Co. | Pt. | 136 | 1.92 |
| Olsen | | 138 | 10.92 |
| Larsen | | 139 | 11.78 |
| Wisenbach | | 145 | 6.27 |
| McAnulty | | 146 | 14.88 |
| McAnulty | | 147 | 16.52 |
| Denton | | 148 | 10.48 |
| McAnulty | | 149 | 7.51 |
| Snyder | | 150 | 7.26 |
| Douthat | | 151 | 9.72 |
| Blackburn | | 152 | 9.70 |
| Neal | | 153 | 9.40 |
| Switzer | | 154 | 9.70 |
| McCarroll | | 200 | 9.40 |
| McCarroll | | 201 | 9.40 |
| Waite | | 202 | 9.40 |
| Bursell | | 203 | 9.98 |
| Schraider | | 204 | 9.85 |
| Waite | | 205 | 9.40 |
| McCarroll | | 206 | 9.40 |
| McCarroll | | 207 | 9.40 |
| Wood | | 248 | 9.40 |
| Kressig | | 250 | 5.25 |
| Stone | | & 13 | 3.75 |
| Burlingame | SE¼ 12-6-33 Wash. | | 150.00 |
| Schaeffer | | | 5.00 |

5-6-34

[fol. 42] Gardena Irrigation Company Rights Sold

Year 1906

| Name | Description | | No. Acres |
|---|---|---|---|
| Stone | Tract | 48 | 5.91 |
| Stone | " | 49 | 9.25 |
| Randall | " | 101 | 7.44 |
| Morrison | " | 103 | 14.50 |
| Shelton | " | 137 | 17.14 |
| Bolick | " | 140 | 10.43 |
| Bolick | " | 141 | 13.54 |
| Burke | " | 155 | 8.87 |
| Brown | " | 156 | 11.65 |
| Thomas | " | 160 | 6.11 |
| Kohler | " | 161 | 8.58 |
| Cunningham | " | 162 | 11.63 |
| Cunningham | " | 208 | 9.24 |
| W. W. I. Co | " | 209 | 8.99 |
| Knauff | " | 210 | 5.10 |
| Johnson | " | 211 | 8.47 |
| Crouch | " | 212 | 7.53 |
| Doege | " | 225 | 12.10 |
| Albin | " | 230 | 4.61 |
| Lansdale | " | 235 | 7.56 |
| Dewey | " | 236 | 4.88 |
| Lansdale | " | 237 | 6.56 |
| Albin | " | 241 | 9.40 |
| Clothier | " | 242 | 11.83 |
| Wood | " | 246 | 6.39 |
| Clothier | " | 247 | 9.70 |
| Minion | " | 249 | 8.98 |
| Sibley | " | 252 | 6.25 |
| Gaiser | " | 260 | 11.69 |
| Heiskell | " | 261 | 9.53 |
| Van Horn | " | 262 | 11.93 |
| Palmer | " | 263 | 5.62 |
| Janosky | N½ | 264 | 5.47 |
| Janosky | S½ | 264 | 4.72 |
| Nordheim | | 265 | 9.12 |
| Nordheim | | 266 | 9.64 |
| Hancock | | 267 | 4.45 |
| Maxin | | 268 | 4.62 |
| McKinsay | | 269 | 9.58 |
| Shuman | | 270 | 10.56 |
| Broxson | | 271 | 9.50 |
| Sargent | | 272 | 9.60 |
| Irving | | 295 | 11.39 |
| Bald | | 308 | 7.57 |
| Shuman | | 309 | 8.77 |
| Laabs | | 313 | 9.92 |
| Laabs | | 316 | 7.08 |
| Dunlap | Sec. 14–6–33 Wash. | | 25.00 |
| W. W. I. Co | Sec. 13–6–33 Wash. | | 50.00 |

[fol. 43] Gardena Irrigation Company Rights Sold

Year 1907

| Name | Description | No. Acres |
|---|---|---|
| Watson | Tract 111 | 8.22 |
| W. W. I. Co. | Tract 215 | 8.20 |
| Riggs | 276 | 11.69 |
| Dresser | 278 | 8.84 |
| Janosky | 283 | 5.47 |
| Riggs | 286 | 9.14 |
| Riggs | 288 | 8.84 |
| Riggs | 289 | 8.49 |
| Riggs | 292 | 8.19 |
| Riggs | 293 | 8.12 |
| Zoellner | 317 | 13.85 |
| W. W. I. Co. | 13-6-33 Wash. | 30.00 |

Year 1908

| | | |
|---|---|---|
| Simmons | 142 | 9.88 |
| Albin | 143 | 8.07 |
| Burlingame | 290 | 8.34 |
| Burlingame | 291 | 9.69 |
| F. A. Moore | 294 | 9.88 |
| Moore | 306 | 14.22 |
| Moore | 307 | 11.98 |
| Moore | 310 | 12.50 |
| Moore | 311 | 10.46 |
| Moore | 312 | 10.69 |
| W. W. I. Co. | Sec. 13-6-33 Wash. | 30.00 |

Year 1909

| | | |
|---|---|---|
| McDonald | 31 | 2.97 |
| Le Pome | 322 | 3.24 |
| W. W. I. Co. | 323 | 4.10 |
| W. W. I. Co. | 324 | 8.10 |
| W. W. I. Co. | 328 | 6.10 |
| W. W. I. Co. | 329 | 4.69 |
| W. W. I. Co. | 331 | 8.10 |
| Le Pome | 334 | 10.39 |
| Le Pome | 338 | 8.36 |
| W. W. I. Co. | 339 | 8.39 |
| W. W. I. Co. | 340 | 5.80 |
| W. W. I. Co. | 341 | 3.66 |
| W. W. I. Co. | 345 | 4.00 |
| W. W. I. Co. | 346 | 7.77 |
| W. W. I. Co. | 347 | 6.80 |
| Le Pome | 350 | 7.27 |
| Le Pome | 351 | 3.22 |
| W. W. I. Co. | 352 | 7.99 |
| Roberts | 385 | 3.82 |
| Roberts | 394 | 3.40 |
| Roberts | 395 | 3.83 |

[fol. 44] Gardena Irrigation Company Rights Sold

Year 1909 (Continued)

| Name | Description | No. of Acres |
|---|---|---|
| Burlingame | 417 | 1.04 |
| W. W. I. Co. | 418 | .73 |
| Roberts | 431 | 2.89 |
| Roberts | 432 | .03 |
| Roe | 451 | 7.61 |
| W. W. I. Co. | 13-6-33 Wash. | 36.16 |
| Roberta | 401 | 3.02 |
| Roberta | 402 | 3.90 |
| Roberta | 403 | 3.69 |
| Roberta | 404 | 7.25 |
| Roberta | 405 | 9.77 |
| Roberta | 430 | .65 |

Year 1910

| | | |
|---|---|---|
| Cohen | 26 | 2.58 |
| Cohen | 27 | 2.81 |
| Cohen | 28 | 2.28 |
| Cohen | 29 | 3.21 |
| Riorden | 30 | 1.60 |
| Thurber | 87 | 13.24 |
| W. W. I. Co. | 172 | 6.30 |
| W. W. I. Co. | 173 | 6.40 |
| W. W. I. Co. | 174 | 7.04 |
| W. W. I. Co. | 175 | 7.08 |
| Reed | 325 | 2.86 |
| Buck | 326 | 4.68 |
| McGowin | 327 | 5.70 |
| McGowin | 332 | 4.89 |
| Buck | 333 | 5.32 |
| McGowin | 342 | 5.01 |
| Reed | 415 | 2.33 |
| Titus | 441 | 2.68 |
| Adams | 442 | 5.53 |
| Adams | 443 | 5.32 |
| Rollo | 444 | 5.27 |
| Rollo | 445 | 5.39 |
| W. W. I. Co. | 446 | 6.34 |
| W. W. I. Co. | 447 | 4.43 |
| Stone | Blk. 13 | .30 |
| Stone | Blk. 15 | 1.21 |
| W. W. I. Co. | 13-6-33 Wash. | 40.00 |
| Burlingame | 7-6-34 Wash. | 10.00 |
| W. W. I. Co. | Tract 408 | 6.73 |
| W. W. I. Co. | " 413 | 5.77 |
| W. W. I. Co. | " 414 | 2.21 |
| W. W. I. Co. | " 428 | 1.75 |

Year 1911

| | | |
|---|---|---|
| Wanstall | Lot 32 | 2.81 |
| Wanstall | " 33 | 2.58 |
| Wanstall | " 34 | 2.44 |
| Wanstall | " 35 | 2.61 |
| W. W. I. Co. | " 164 | 2.55 |
| W. W. I. Co. | " 221 | 1.53 |
| Stone | " 448 | 8.23 |
| Carlton | " 409 | 6.29 |

[fol. 45] Gardena Irrigation Company Rights Sold

Year 1912

| Name | Description | No. Acres | |
|---|---|---|---|
| Hughes | Lot 88 | 13.30 | |
| W. W. I. Co. | Lot 176 | 14.10 | |
| W. W. I. Co. | Lot 177 | 6.50 | |
| W. W. I. Co. | Lot 178 | 10.93 | |
| W. W. I. Co. | Lot 182 | 3.79 | |
| W. W. I. Co. | Lot 183 | 10.12 | |
| W. W. I. Co. | Lot 186 | 11.72 | |
| W. W. I. Co. | Lot 187 | 2.08 | |
| W. W. I. Co. | Lot 238 | 6.73 | |
| W. W. I. Co. | Lot 239 | 10.12 | |
| W. W. I. Co. | Lot 319 | 4.99 | |
| W. W. I. Co. | Lot 320 | 5.07 | |
| W. W. I. Co. | Lot 321 | 5.02 | |
| W. W. I. Co. | Lot 335 | 7.18 | |
| W. W. I. Co. | " 336 | 6.11 | |
| W. W. I. Co. | " 337 | 4.49 | |
| Shaw | " 379 | 6.63 | |
| Shaw | " 380 | 4.93 | |
| Shaw | " 381 | 7.16 | |
| Shaw | " 382 | 5.81 | |
| Shaw | " 383 | 4.82 | |
| Shaw | " 384 | 4.60 | |
| Shaw | " 396 | 6.32 | |
| Shaw | " 397 | 6.81 | |
| Shaw | " 398 | 3.10 | |
| W. W. I. Co. | " 429 | .96 | |
| Shaw | " 399 | 2.51 | |
| W. W. I. Co. | " 400 | 4.35 | |
| W. W. I. Co. | Sec. 15–6–33 | 15.00 | |

Year 1914

| | | | |
|---|---|---|---|
| Simmons | Lot 144 | 6.78 | |
| Gibbson | Lot 416 | 1.75 | |
| Dickinson | 11–6–33 Wash. | 35.00 | |
| F. H. Munns | 17–6–33 | 10.00 | |
| Sullivan | 9–6–34 | 20.00 | |
| Johnson | 9–6–34 | 10.00 | |
| Witherite | ..... | 60.00 | (Abandoned in 1918) |
| Weatherman | ..... | 12.00 | (Abandoned in 1918) |
| W. W. I. Co. | 15–6–33 | 15.00 | |

Year 1915

| | | | |
|---|---|---|---|
| W. W. I. Co. | Pt. 123 | 9.58 | |
| W. W. I. Co. | Pt. 130 | 8.28 | |
| Moore | Lot 297 | 19.99 | |
| Moore | " 298 | 8.17 | |
| Moore | " 299 | 12.74 | |
| Moore | " 300 | 5.22 | |
| Moore | " 301 | 3.34 | |
| Moore | " 302 | 3.89 | |
| Moore | " 303 | 6.48 | |
| Moore | " 304 | 7.39 | |
| Moore | " 305 | 10.08 | |
| W. W. I. Co. | 16–6–33 | 45.00 | |
| E. C. Burlingame | 17–6–33 | 90.00 | |
| Burlingame | 10–6–34 | 56.96 | |
| Burlingame | 11–6–34 | 50.00 | |

[fol. 46] Gardena Irrigation Company Rights Sold

Year 1916

| Name | Description | No. of Acres |
|---|---|---|
| Burlingame | 16–6–33 | 60.00 |
| Burlingame | 11–6–34 | 10.00 |
| Burlingame | Sec. 18–6–34 | 25.00 |
| W. W. I. Co. | 14–6–33 | 26.00 |

Year 1917

| | | | |
|---|---|---|---|
| W. W. I. Co. | Lot | 166 | 13.90 |
| Paine Brothers | Lot | 273 | 6.49 |
| Paine Brothers | Lot | 274 | 4.89 |
| Paine Brothers | " | 275 | 15.38 |
| Paine Brothers | " | 277 | 8.97 |
| Burlingame | 18–6–34 | | 40.00 |
| Burlingame | 16–6–33 | | 44.76 |
| Burlingame | 10–6–34 | | 25.00 |
| Burlingame | 11–6–34 | | 15.00 |
| Burlingame | 18–6–34 | | 20.00 |
| W. W. I. Co. | 15–6–33 | | 29.80 |
| W. W. I. Co. | 15 & 16–6–33 | | 14.09 |

Year 1918

| | | | |
|---|---|---|---|
| Day | Lot | 104 | 15.95 |
| Riggs | Pt. | 157 | 2.04 |
| W. W. I. Co. | Lot | 213 | 3.37 |
| W. W. I. Co. | Lot | 214 | 9.63 |
| W. W. I. Co. | Lot | 231 | 7.52 |
| W. W. I. Co. | Lot | 232 | 7.24 |
| W. W. I. Co. | Lot | 233 | 7.61 |
| W. W. I. Co. & Gray | Lot | 240 | 4.58 |
| W. W. I. Co. | Lot | 243 | 7.46 |
| W. W. I. Co. | Lot | 244 | 9.40 |
| W. W. I. Co. | Lot | 245 | 11.75 |
| Paine Bros. | Lot | 285 | 11.01 |
| Paine Bros. | Lot | 287 | 13.18 |
| Paine Bros. | Lot | 314 | 11.28 |

[fol. 47]

| | | | |
|---|---|---|---|
| Paine Bros. | Lot | 315 | 8.26 |
| Paine Bros. | Lot | 318 | 13.21 |
| W. W. I. Co. | Lot | 345 | 5.68 |
| W. W. I. Co. | Lot | 372 | 5.37 |
| Dickinson | 11–6–33 | | 25.00 |
| Burlingame | 10–6–34 | | 25.00 |
| Burlingame | 11–6–34 | | 10.00 |
| Burlingame | 18–6–34 | | 13.00 |
| W. W. I. Co. | 13–6–33 | | 65.00 |
| W. W. I. Co. | 14–6–33 | | 19.24 |
| W. W. I. Co. | 14 & 15–6–33 | | 50.00 |

Year 1919

| | | | |
|---|---|---|---|
| W. W. I. Co. | Lot | 355 | 4.13 |
| W. W. I. Co. | Lot | 356 | 7.41 |
| W. W. I. Co. | Lot | 362 | 7.69 |
| W. W. I. Co. | Lot | 419 | 3.43 |
| Burlingame | 7–6–34 | | 18.00 |
| F. H. Munns | 17–6–33 | | 7.74 |
| Mang | 3–6–34 | | 35.43 |
| Mang | 3–6–34 | | 29.58 |
| Rohn | 4–6–34 | | 54.00 |
| Rohn | 4–6–34 | | 28.50 |
| Rohn | 5–6–34 | | 29.53 |

## Gardena Irrigation Company Rights Sold

### Year 1919 (Continued)

| Name | Description | No. Acres |
|---|---|---|
| Moore | 6-6-34 | 161.57 |
| Burlingame | 11-6-34 | 15.00 |
| Rohn | 33-7-34 | 2.97 |
| W. W. I. Co. | 13-6-33 | 70.00 |

### Year 1920

| | | |
|---|---|---|
| Grandy | Lot 76 | 13.24 |
| Watson | Lot 94 | 15.58 |
| Watson | Lot 98 | 14.61 |
| Inman | Lot 109 | 9.91 |
| Inman | Lot 110 | 12.52 |
| Montgomery | Pt. 251 | 4.50 |
| Montgomery | Pt. 253 | 8.15 |
| Montgomery | Pt. 255 | 2.50 |
| Montgomery | Pt. 257 | 2.00 |
| Montgomery | Pt. 259 | .50 |
| Ownby | Lot 449 | 5.98 |
| Ownby | Lot 450 | 5.08 |
| Paine Bros. | Sec 5-6-33 | 71.50 |
| Paine Bros. | Sec 6-6-33 | 14.33 |
| Paine Bros. | Sec 7-6-33 | 90.00 |
| Craig | 4-6-34 | 58.80 |
| Schaeffer | 5-6-34 | 15.00 |
| Burlingame | 18-6-34 | 5.00 |
| W. W. I. Co. | 13 & 14-6-33 | 60.00 |

[fol. 48]

### Year 1921

| | | |
|---|---|---|
| Rector | Lot 91 | 7.98 |
| Paine Bros. | 279 | 10.98 |
| Paine Bros. | 280 | 8.10 |
| Paine Bros. | 281 | 7.48 |
| Paine Bros. | 282 | 7.42 |
| Paine Bros. | 284 | 7.31 |
| W. W. I. Co. | 348 | 5.74 |
| W. W. I. Co. | 349 | 5.73 |
| W. W. I. Co. | Lot 358 | 7.28 |
| Schaeffer | 5-6-34 | 34.00 |
| Burlingame | 9-6-34 | 80.00 |
| Burlingame | 18-6-34 | 5.00 |
| W. W. I. Co. | 13-6-33 | 40.00 |

### Year 1923

| | | |
|---|---|---|
| Burlingame | 9-6-34 | 20.00 |
| Burlingame | 13-6-13? | 10.00 |
| Burlingame | 18-6-34 | 22.92 |
| W. W. I. Co. | 13 & 24-6-33 | 40.00 |
| W. W. I. Co. | 13-6-33 | 45.00 |

### Year 1924

| | | |
|---|---|---|
| Burlingame | 13-6-13 | 20.00 |

### Year 1925

| | | |
|---|---|---|
| Burlingame | 9-6-34 | 20.00 |
| Hellberg | 14-6-34 | 86.00 |
| White | 15-6-34 | 60.00 |
| Burlingame | 13-6-13 | 15.00 |

### Year 1926

| | | |
|---|---|---|
| Burlingame | 13-6-13 | 10.00 |

## Gardena Irrigation Company Rights Sold

| Name | Description | Acres |
|---|---|---|
| | Year 1927 | |
| Johnson | Lot 170 | .25 |
| W. W. I. Co. & Gray | 240 | 4.00 |
| Kellough | Lot 357 | 8.15 |
| Blair | Lot 358 | 8.26 |
| Burlingame | 13–6–13 | 13.23 |
| Johnson | Lot 77 | 11.34 |
| | Year 1928 | |
| W. W. I. Co. | Lot 171 | 10.00 |
| Nelson | Lot 222 | 7.31 |
| Nelson | Lot 223 | 6.50 |
| Nelson | Lot 229 | 2.00 |
| Nelson | Lot 234 | 6.16 |
| Murray | 6–6–34 | 6.50 |
| [fol. 49] | Year 1929 | |
| W. W. I. Co. | 14–6–33 | 13.51 |
| | Year 1930 | |
| Thornston | Lot 106 | 13.18 |
| Thornton | Lot 107 | 10.00 |
| Haining | Pt. 157 | 10.65 |
| Kellough | Lot 357 | 8.91 |
| Kellough | Lot 360 | 7.94 |
| Kellough | Lot 363 | 9.58 |
| Kellough | Lot 375 | 7.11 |
| Kellough | Lot 387 | 5.77 |
| Kellough | Lot 388 | 3.92 |

## Undeveloped Land With Water Right—Paying Maintenance Since 1928

| Gardena | Acres | Washington | Acres | Oregon (Through Gardena) | Acres |
|---|---|---|---|---|---|
| Lot 95 | 2.48 | Lot 423 | 1.67 | Lot 406 | 7.53 |
| 163 | 5.00 | 424 | 2.71 | 407 | 3.68 |
| 165 | 7.00 | 425 | 4.41 | 433 | .19 |
| 169 | 4.00 | 426 | 1.36 | 434 | 1.11 |
| 216 | 4.69 | 427 | 1.19 | 436 | .55 |
| 219 | 4.00 | 435 | .52 | 438 | 2.23 |
| 220 | 2.00 | 437 | .48 | 439 | .16 |
| 224 | 4.00 | | | | |
| 330 | 8.45 | Total Wash. | 201.11 | Total Oregon | 15.45 |
| 344 | 8.94 | | | | |
| 361 | 7.63 | | | | |
| 364 | 7.87 | | | | |
| 365 | 6.73 | Wash. | 201.11 | | |
| 366 | 5.62 | Oregon | 15.45 | | |
| 367 | 7.15 | | | | |
| 368 | 6.51 | | 216.56—Total Unimproved. | | |
| 369 | 3.71 | | | | |
| 370 | 5.52 | | | | |
| 371 | 7.14 | | | | |
| 373 | 8.00 | | | | |
| 374 | 9.28 | | | | |
| 376 | 5.69 | | | | |
| 377 | 7.03 | | | | |
| 378 | 7.55 | | | | |
| 389 | 9.11 | | | | |
| 390 | 7.63 | | | | |
| 391 | 8.94 | | | | |
| 392 | 6.46 | | | | |
| 393 | 9.06 | | | | |
| 420 | .69 | | | | |
| 421 | .88 | | | | |
| 422 | .01 | | | | |

[fol. 50] The foregoing tabulation of water contracts sold by the Company up to 1930 totals 5793.09 acres. Of this amount 372 acres were later abandoned, leaving water rights outstanding for 5421.09 acres, of which there are 201.11 acres in Washington and 15.45 acres in Oregon for which irrigation payments are being made, but which are not now being irrigated. A survey by Oregon indicates that in 1933 there was irrigated from the system 4530.2 acres in Washington and 721.3 acres in Oregon, being 46.97 acres more than the above tabulation.

The soil West of the syphon is deep and rich, and with irrigation produces abundant crops. Approximately 85 families live on the lands served by this irrigation system. West of the syphon is a church and a school employing two teachers.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

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[fol. 51] EXHIBIT "A" TO STIPULATION

Amended

Certificate of Water Right

This is to certify:

That by virtue of a decree of the Superior Court of the State of Washington in and for Walla Walla County, made and entered on the 12th day of September, 1928, and recorded in Volume 16 of the Superior Court Journal of said County at page 1 and Amendment thereto, dated February 26th, 1931, from which decree no appeal was taken, and which decree determined the rights of all known claimants to the use of the water of Walla Walla River, a tributary of Columbia River, Walla Walla Irrigation Company,

Walla Walla, Washington is entitled to use, subject to provisions set forth in said decree, and the laws of the State of Washington, the waters of said Walla Walla River for the purpose of irrigation.

That the amount of water to which said water right is entitled is limited to the quantity which is reasonably and actually necessary for the purpose aforesaid and shall not exceed 93.333 second feet from April 1st to July 1st, 70.000 second feet from July 1st to October 1st, and 140.000 second feet from October 1st to April 1st for the irrigation of 7000.00 acres of the lands hereinafter described. If water is used during the last named period in addition to either or both of the two first named periods, the combined supply shall not exceed five acre feet per acre.

That the date of priority of said water right is 1892; that the decree aforesaid establishes said right in Class Thirty. [fol. 52] That the point of diversion of said water right is as follows:

The S. W. ¼ of the S. W. ¼ of section 3, township 6 north, range 35 E. W. M.

and cannot be changed except as provided in Section 39, Chapter 117, Session Laws of 1917.

That said water right was adjudged by said decree to be and is appurtenant to the following described real property situated in Walla Walla County, Washington, to-wit:

Here follows descriptions of lands as set out on pages 69 to 72, under claim No. 570 in case of State of Washington vs. Achermann, et al., No. 19075, in the Superior Court of the State of Washington for Walla Walla County.

This instrument is recorded in the office of the Supervisor of Hydraulics, at Olympia, Washington, in Volume 4A of Water Right Certificates at Page 406.

Witness the seal and signature of the Supervisor of Hydraulics affixed this 17th day of April, 1931.

Chas. J. Bartholet, Supervisor of Hydraulics of the State of Washington. (Seal).

Engineering Data. J. F. R. A.

[fol. 53] EXHIBIT "B" TO STIPULATION

## Water Appropriation

To whom it may concern:

Notice is hereby given that we, the undersigned, John F. Boyer, T. J. Kirk and W. F. Courtnay desiring to appropriate the quantity of water hereinafter mentioned from the Walla Walla River in the County of Walla Walla, State of Washington, under and by virtue of the laws of said state do hereby appropriate and claim of the waters of said river as follows:

1. We claim and appropriate the water flowing in said Walla Walla River in said County and State to the extent of 200 cubic feet per second of time.

2. The said water is appropriated and claimed by us for irrigation purposes and manufacturing purposes.

3. The places of intended use of the water by us claimed and appropriated pursuant to this notice: All in township 7, North of Ranges 33, 34 & 35 East of the Willamette Meridian and in township 6, North Ranges 33, 34 & 35 East of the Willamette Meridian.

4. We intend to and shall divert the water by us claimed and appropriated by means of dams, ditches and flumes and the point of diversion thereof from the channel of said Walla Walla River shall be in the S. W. ¼ of Section 30, Tp. 6, N. Range 35, E. W. M., said point being distant on the South bank of the river about 500 feet below the highway bridge across the Walla Walla River; and just above the mouth of Garrison Creek. Posted this 24 day of February, 1892.

Witnesses: A. L. Adams. R. C. Gernmell. F. J. Kirk. J. F. Boyer. W. F. Courtnay.

Filed February 24, 1892 at 3:40 P. M. Recorded in Book 1 of W. App'ns. page 21.

[fol. 54] EXHIBIT "C" TO STIPULATION

## Notice of Appropriation of Water

Walla Walla, Wash., July 12, 1892.

By Walla Walla Irrigation Company, a Corporation under the laws of the State of Washington.

To all persons concerned and to the Public Generally.

Notice is hereby given: That the Walla Walla Irrigation Company has appropriated and hereby does appropriate and claim the water lying being and flowing in the Walla Walla River to the intent of 300 cubic feet of said water per second of time.

The point from which said water is to be taken or diverted is indicated and described as follows: Beginning at a point in the County road 45 feet from the North of the Newcomb Bridge as located and built by the County across the Walla Walla River on the McBean Donation Claim thence South 17° 15′ E. 560 feet; thence N. 73° 30′ E. 70 feet to the point of appropriation said point of appropriation is further described as being located in Township 6, N. R., 35, E. W. M.

The said water is appropriated for the said purpose of irrigation and domestic uses and for the development of water power.

The approximate location of said canal which said corporation proposes to construct is as follows, beginning at the initial point of appropriation as hereinbefore described by the general direction of the canal will be S'ly with variation both east and west.

The Corporation also proposes to construct storage reservoirs along the line of the proposed canal or at any other locations that are best situated to the interest of the Corporation to locate them.

[fol. 55] The land to be irrigated by the building of the proposed canal lies in the State of Washington also in the State of Oregon.

Said Corporation reserves the right to use and develop the water power of said canal as the future interests and the welfare of the community may direct.

The Walla Walla Irrigation Company, by J. F. Boyer, President. E. C. Burlingame, Secretary. (Seal.)

Walla Walla, Washington, July 12, 1892.

At a meeting of the stockholders and directors of the Walla Walla Irrigation Company held July 12, at Walla Walla, Washington, E. C. Burlingame the Secretary of the Company was duly authorized to proceed to the location as described in the notice of appropriation and empowered to file the above and foregoing notice of the appropriation of Water Rights.

The Walla Walla Irrigation Company, by J. F. Boyer, President. E. C. Burlingame, Secretary. (Seal.)

Filed, August 3, 1892 at 10 A. M. Recorded in Book 1 of Water App'ns., page 39.

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[fol. 56] EXHIBIT "D" TO STIPULATION

Water Appropriation

To whom it may concern:

Notice is hereby given that the undersigned have appropriated and claimed and hereby appropriate and claim 500 cubic feet per second of time of the waters of the Walla Walla River now in said river at the place opposite where this notice is posted, lying, being and flowing; that said waters are appropriated and claimed for irrigation and manufacturing purposes; that said waters thus appropriated and claimed are to be taken from said river at the place where this notice is posted and conducted through and by means of a ditch or canal four feet in depth, twenty feet wide at the bottom and thirty feet wide at the top extending from this point by the most suitable and practicable route in a general N. W.'ly direction passing near the mouth of the Touchet River, to a point on the Columbia River near the mouth of Snake River; that all the lands contributory to said ditch or canal capable to being irrigated are to be irrigated by said appropriated and claimed waters.

Dated July 24, 1891.

J. T. Kirk. J. F. Boyer. W. F. Courtnay.

Filed, July 24, 1891 at 5 P. M. Recorded in Book 1 of Water App'ns., page 11.

[fol. 57] EXHIBIT "E" TO SPECULATION

## Water Appropriation

To whom it may concern:

Note is hereby given That we the undersigned John F. Boyer, T. J. Kirk and W. F. Courtnay desire to appropriate the quantity of water hereinafter mentioned from the Little Walla Walla River in the County of Walla Walla, State of Washington, under and by virtue of the laws of said state do hereby appropriate and claim the waters of said stream as follows:

1. We claim and appropriate the waters flowing in said stream in said County and State to the amount of 100 cubic feet per second of time.

2. The said water is appropriated and claimed by us for irrigation purposes and for manufacturing purposes.

3. The places of intended use of the waters by us claimed and appropriated pursuant to this notice are in Township 7, North of ranges 33, 34 & 35, East of the Willamette Meridian and in Township 6, North of Range 33, 34 & 35 East of Willamette Meridian.

4. We intend and shall divert the water by us claimed and appropriated by means of dam, ditches and flumes; and the point of diversion from the channel of said stream — shall be in the Northwest ¼ of Sec. 9, Township 6, North Range 35, East Willamette Meridian said point being designated by a large cottonwood tree in the South bank of said stream marked by three cuttings with an axe. Posted this 24" day of February, 1892.

Witnesses: A. L. Adams. R. C. Gemmell. T. J. Kirk. J. F. Boyer. W. F. Courtnay.

Filed for record February 24th, 1892 at 3:30 P. M. Recorded at the request of J. F. Boyer. Recorded on Book 1 of Water App'ns., page 23.

W. B. Hawley, Auditor.

[fol. 58]

EXHIBIT "F" TO STIPULATION

Walla Walla Irrigation Company—Development by Years

| Years | Construction | Wood Pipe | Concrete Sewer Pipe | Concrete Pipe | Reservoir | Engineering | Rights of way | Wells | Totals |
|---|---|---|---|---|---|---|---|---|---|
| 1892–1893 | 7,727.09 | ..... | ..... | ..... | ..... | 1,536.80 | 2,336.50 | ..... | 11,600.39 |
| 1894–1895, 1896 | 11,812.90 | ..... | ..... | ..... | ..... | 50.— | 301.50 | ..... | 12,164.40 |
| Totals | 19,539.99 | ..... | ..... | ..... | ..... | 1,586.80 | 2,638.00 | ..... | 23,764.79 |
| 1897 to 1904, Inc. | 27,536.87 | ..... | ..... | ..... | ..... | 218.45 | 2,214.67 | ..... | 29,969.99 |
| Totals | 47,076.86 | ..... | ..... | ..... | ..... | 1,805.25 | 4,852.67 | ..... | 53,734.78 |
| 1905 | 27,307.47 | 15,218.29 | ..... | ..... | ..... | 1,361.10 | 85.— | 240.50 | 44,212.36 |
| Totals | 74,384.33 | 15,218.29 | ..... | ..... | ..... | 3,166.35 | 4,937.67 | 240.50 | 97,947.14 |
| 1906 | 12,575.75 | ..... | ..... | ..... | ..... | 913.90 | 339.— | ..... | 13,828.65 |
| Totals | 86,960.08 | 15,218.29 | ..... | ..... | ..... | 4,080.25 | 5,276.67 | 240.50 | 111,775.79 |
| 1907 | 7,405.32 | ..... | ..... | ..... | 798.— | ..... | ..... | ..... | 8,203.32 |
| Totals | 94,365.40 | 15,218.29 | ..... | ..... | 798.— | 4,080.25 | 5,276.67 | 240.50 | 119,979.11 |
| 1908 | 15,617.92 | ..... | ..... | ..... | ..... | 17.60 | ..... | ..... | 15,635.52 |
| Totals | 109,983.32 | 15,218.29 | ..... | ..... | 798.— | 4,097.85 | 5,276.67 | 240.50 | 135,614.63 |
| 1909 | 16,653.39 | ..... | ..... | ..... | ..... | 857.70 | 800.— | 6,155.50 | 24,466.59 |
| Totals | 126,636.71 | 15,218.29 | ..... | ..... | 798.— | 4,955.55 | 6,076.67 | 6,396.00 | 160,081.22 |

[fol. 59]

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Forward Totals to 1909 | 126,636.71 | 15,218.29 | ..... | ..... | 798.— | 4,955.55 | 6,076.67 | 6,396.00 | 160,081.22 |
| 1910 | 3,954.02 | ..... | 34,389.70 | ..... | ..... | 1,471.64 | 1,771.60 | 122.50 | 41,709.46 |
| Totals | 130,590.73 | 15,218.29 | 34,389.70 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,518.50 | 201,790.68 |
| 1911 | ..... | ..... | 14,713.67 | ..... | ..... | ..... | ..... | 178.75 | 14,892.42 |
| Totals | 130,590.73 | 15,218.29 | 49,103.37 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,697.25 | 216,683.10 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1912..... | ..... | ..... | 152.55 | ..... | ..... | ..... | ..... | ..... | 152.55 |
| Totals..... | 130,590.73 | 15,218.29 | 49,255.92 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,697.25 | 216,835.65 |
| 1913..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 140.— | 140.— |
| Totals..... | 130,590.73 | 15,218.29 | 49,255.92 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,837.25 | 216,975.65 |
| 1914–1915..... | 252.95 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 252.95 |
| Totals..... | 130,843.68 | 15,218.29 | 49,255.92 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,837.25 | 217,228.60 |
| 1917 Dam at River | 1,300.38 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,300.38 |
| Totals..... | 132,144.06 | 15,218.29 | 49,255.92 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,837.25 | 218,528.98 |
| [fols. 60 & 61] | | | | | | | | | |
| Forward Totals to 1917..... | 132,144.06 | 15,218.29 | 49,255.92 | ..... | 798.— | 6,427.19 | 7,848.27 | 6,837.25 | 218,528.98 |
| (Gardena) 1920 Concrete Pipe.. | ..... | ..... | ..... | 5,400.50 | ..... | ..... | ..... | ..... | 5,400.50 |
| Totals..... | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.— | 6,427.19 | 7,848.27 | 6,837.25 | 223,929.48 |
| 1924..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,500.— | 1,500.— |
| Totals..... | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.— | 6,427.19 | 7,848.27 | 8,337.25 | 225,429.48 |
| 1925..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,649.08 | 1,649.08 |
| Grand Totals | 132,144.06 | 15,218.29 | 49,255.92 | 5,400.50 | 798.— | 6,427.19 | 7,848.27 | 9,986.33 | 227,078.56 Cost of System |

The item "Wood Pipe" $15,218.29 is the wood stave pipe across Pine Creek to Gardena. Estimated cost about $25,000.00. The item "Concrete Pipe" 1920—Gardena is the pipe extending West along South line Section 5-6-33 to Paine land.

[fol. 62] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION No. 6—STATEMENT OF ISSUES AS TO GARDENA

With respect to the rights of the Gardena Farms District, successor in interest to the Walla Walla Irrigation Company, reserved for further treatment as item (1) of paragraph II in the stipulation of October 21, 1933, between the parties hereto.

The State of Oregon contests the rights of the Gardena Farms District as set forth in the decree of the Superior Court of the State of Washington for the County of Walla Walla in the case of State of Washington, plaintiff, vs. Chas. Achermann et als, defendants, No. 19075, which rights are there set forth under the name of the Walla Walla Irrigation Company under proof No. 570, and alleges as follows, to-wit:

I

The appropriators and their successors in interest have not been diligent in the application of water to a beneficial use so that the lands irrigated do not by relation secure a priority date as of the date of posting of notices of appropriation or the beginning of construction work upon the canals and diversion works. And each of the several tracts of land irrigated through the works of the Gardena Farms District has a priority date as of the year in which said tract was first irrigated, which dates are substantially shown by the contracts for the sale of water to said lands, as per list in agreed statement of facts. Lands not yet irrigated have no water right.

[fol. 63]

II

The original intention of the appropriators and the Walla Walla Irrigation Company was to construct a main canal from the diversion point in the McBean Donation land claim in the Southwest quarter of the Southwest quarter of Section 3, Township 6 North, Range 35 E. W. M., along the route of the canal shown on the official map in a Southwesterly direction to a point in Lot 3 of fractional Section 13, Township 6 North, Range 34 E. W. M., and thence Southerly into the State of Oregon, upon the line marked on the

official map as "not in use in 1932," and across South Mud Creek, and also along the line marked on the official map, "used as Hudson Bay Lateral, 1932," across Dry Creek and thence West across Pine Creek, and thence Northwest along the line as indicated on the official map as "Walla Walla Irrigation Co. canal," and thence in a Northwesterly direction crossing into the State of Washington in Section 16, Township 6 North, Range 33 E. W. M., and thence to the Walla Walla River in Section 7, Township 6 North, Range 33 E. W. M. And to construct a lateral from said point in Lot 3 of fractional Section 13, Township 6 North, Range 34, E. W. M., in a Northwesterly direction to a point at about the North and South center line of Section 5, Township 6 North, Range 34 E. W. M., about 80 rods South of the center of said Section, and to construct a second lateral from said main canal from a point about the center of Section 24, Township 6 North, Range 34 E. W. M., in a Northwesterly direction for a distance of about two miles through Section 23, 14, and 15 in the same Township and Range; and to irrigate from said canals only such lands as could be conveniently served by open ditches. Said original intention did not contemplate the construction of any siphons for the purpose of irrigating any lands, or the irrigation of any lands for which a syphon was required.

In accordance with said intentions, said Walla Walla Irrigation Company constructed the main canal from said diversion point to said point in Lot 3 of said fractional Section 13, and also constructed their main canal from said point in said Lot 3 in a Southerly direction along the line [fol. 64] as shown on the official map into Oregon for a distance of 18 miles to a point in Section 19, Township 6 North, Range 34 E. W. M., and also constructed the two laterals above described. In the year 1904 said Walla Walla Irrigation Company changed their intentions and formulated a plan whereby said lateral constructed from said point in said Lot 3 of said fractional Section 13 was changed to a main canal and widened, from eight to ten feet on the bottom, and extended to the Southwest quarter of the Northwest quarter of Section 5, Township 6 North, Range 34 E. W. M., from which point a syphon was extended across the valley of Pine Creek for a distance of one and one-half miles to the Northeast quarter of the Southeast quarter of Section 12, Township 6 North, Range 33 E. W. M., from which point a distribution system for the irrigation of the

lands West and South of the said syphon was constructed. By said change of intention and construction of canals and syphons, said Walla Walla Irrigation Company brought under irrigation about 1800 acres of land not included in their original appropriation, and which they could not have irrigated under their original plan, thereby initiating a new appropriation for said lands which could in no event have an earlier date of priority than 1904, irrespective of the question of diligence as raised in paragraph "I" herein. Thereafter, in the year 1919, said Walla Walla Irrigation Company abandoned all that part of its original main canal and lateral lying South and West of said point in Lot 3 of fractional Section 13, Township 6 North, Range 34 E. W. M., and abandoned its intention to irrigate any of the lands to be served thereby and not reached by their present distribution system.

III

As against the Gardena Farms District, as well as all other rights in the State of Washington, the State of Oregon raises the issue of vested rights, the Statute of Limitations, adverse use, and estoppel as set forth in its Answer on file herein, and alleges that as against the State of Oregon, its citizens and water users, the permits of the Supervisor of Hydraulics of the State of Washington for the appropriation of water, and the decrees of the Courts of the State [fols. 65 & 66] of Washington neither determine nor fix any rights.

IV

The State of Washington alleges and maintains that the rights of Gardena Farms District are as set forth in the decree of the Superior Court of the State of Washington in and for Walla Walla County, in the case of State of Washington, plaintiff, vs. Chas. Achermann, et als, defendants, No. 19075, and as set forth in the Certificate of water right referred to as exhibit "A" in the agreed facts on file herein.

V

The State of Washington challenges the legal sufficiency of each of the grounds of contest of the rights of Gardena Farms District as set forth by the State of Oregon, in paragraphs I, II, and III, herein, as constituting a defense or as sustaining any rights of the State of Oregon in this action.

VI

The State of Washington denies each and every allegation set forth in the contest of the rights of Gardena Farms District made by the State of Oregon herein, except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Asst. Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

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[fol. 67] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 7—STATEMENT OF ISSUES AS TO WATER REQUIREMENTS

With respect to the water requirements of the lands to which water is awarded in any or all of the permits, or in any or all of the decrees which were reserved for further treatment as item (2) of paragraph II in the Stipulation of October 21, 1933, between the parties hereto;

The State of Washington contests the rights of the State of Oregon and its citizens and water users to the respective amounts of water awarded to and used by them by virtue of the decrees of the Courts of the State of Oregon and the permits of the State Engineer of the State of Oregon, or otherwise, and raises the following issues with respect to the water requirements of the soils of the related lands in the contested area in the State of Oregon classified according to soil types as indicated on the F. O. Youngs' soil map as affecting the rights of the respective states in this case.

I

The State of Washington alleges that the water requirements for soils falling in group Nos. ID, 4, and 5 should

not exceed 1/80 of a second foot (½ miners inch) per acre during actual irrigation of the land, but limited to 3 acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group Nos. 1, 1R, and 1RA should not exceed 1/90 of a second foot (4/9 miners inch) per acre during actual irrigation of the land but limited to 4 [fol. 68] and 1/3 acre feet, apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group No. 2A should not exceed 1/50 of a second foot (4/5 miners inch) per acre during actual irrigation of the land, but limited to 6½ acre feet apportioned ratably during each month during an irrigation season of 6½ months; that the water requirements for soils falling in group No. 2B should not exceed 1/45 of a second foot, (8/9 miners inch) per acre during actual irrigation of the land, but limited to 7½ acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group No. 3 should not exceed 1/40 of a second foot (1 miners inch) per acre during actual irrigation of the land, but limited to 9 3/4 acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the allotments of water hereinabove specified shall in every instance be measured at the stream diversion point.

II

The State of Oregon alleges and maintains that the rights of said State and of its citizens and water users to the use of surface waters of said State are as fixed by the decrees of the Courts of said State, and the permits for the appropriation of water issued by the State Engineer of the said State, and by the use of said waters, and alleges that the decree on the mandate entered in the Circuit Court of the State of Oregon for Umatilla County in the matter of the Determination of the Relative Rights To The Use of the Waters of The Walla Walla River, Etc., dated February 20, 1933, fixes the right to the use of the surface waters in the part of the contested area covered by said decree in Oregon as follows:

(1). For all lands irrigated under permit by the Pleasant View Irrigation Company a flow of 1/80 cubic foot per sec-

ond per acre, (.0125 c. f. s.) plus 20 per cent for transportation losses.

(2). For all lands irrigated by the Milton-Freewater and [fol. 69] Hudson Bay Irrigation Company a flow of 75 cubic feet per second for 2675.76 acres.

(3). For the F. Mauch and Margaretha Mauch land (Proof No. 543) a flow of 2 miners inches per acre (.05 c. f. s.).

(4). For all other lands a flow of one and one-half miners inches per acre (.0375 c. f. s.) provided that where an irrigated tract is less than one acre and more than one-half acre it should receive a flow of one and one-half miners inches (.0375 c. f. s.), and where less than one-half acre it should receive a flow of one miners inch, (.025 c. f. s.).

The decree in the Circuit Court of the State of Oregon for Umatilla County in the matter of the Determination of the Relative Rights to the Use of the Waters of The West Prong of the Little Walla Walla River, Etc., dated September 11, 1916, fixes the rights to the use of surface waters in the part of the contested area covered by said decree for each tract of land separately, and fixes the flow for each tract of land at respective amounts from one-half miners inch per acre, (.0125 c. f. s.) to 1¼ miners inches per acre, (.03125 c. f. s.).

The permits for the appropriation of water issued by the State Engineer of Oregon fix the rights to the use of surface water in the part of the contested area covered by said permits at a flow of ½ miners inch per acre, (.0125 c. f. s.) except as to the Pleasant View Irrigation Company, an additional amount of 20 per cent was allowed by the Court for transportation losses.

A miners inch under the Oregon law is equivalent to 1/40 of a cubic foot per second and all measurements under Oregon decrees and permits are made at the point of diversion. The said decrees and permits further limit the use of water to the amount required for beneficial use not to exceed the amounts hereinabove stated.

III

The State of Oregon alleges the stream is subject to an annual spring freshet, during which the water supply [fol. 70] greatly exceeds any use, and during said time the

overplus is not used and runs to waste into the Columbia, and said stream is flashy throughout the year; the crops raised are diversified and require irrigation at different times of the year according to the crop, and any limitation on an acre foot basis is impracticable and would destroy the flexible use of the water to which the water users have acquired a right.

IV

The State of Oregon challenges the legal sufficiency of the grounds of contest of the rights of the State of Oregon, its citizens, and water users to the respective amounts of water awarded to and used by them, and the issues raised with respect to the water requirements of the soils of the related lands in the contested area in the State of Oregon as set forth in paragraph I herein as constituting a cause of action or as sustaining any rights of the State of Washington in this action.

V

The State of Oregon denies each and every allegation set forth in the contest of the rights of the State of Oregon, its citizens and water users to the respective amounts of water awarded to and used by them upon the lands in the contested area except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case; and the State of Oregon alleges that the use of the several amounts of water as alleged by the State of Washington in paragraph I would not produce or mature the crops upon the lands in said contested area.

VI

As against the contest by the State of Washington on the rights of the State of Oregon, its citizens and water users to the respective amounts of water awarded to and used by them on the lands in the contested area, the State of Oregon raises the issue of vested rights, the Statute of Limitations, adverse use and estoppel as set forth in its Answer on file [fols. 71 & 72] herein.

VII

The affirmative allegations on the part of the State of Oregon above set forth are deemed denied by the State of Washington.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Asst. Attorney General of Washington: Fred. F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

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[fol. 73] In Supreme Court of the United States

[Title omitted]

Stipulation No. 8—Relating to Decrees, Etc.

It is hereby stipulated by and between the undersigned counsel for the respective states:

That the several decrees referred to in paragraphs I and II in the stipulation of October 21, 1933 between the parties hereto shall be considered in this case in their relation to the respective Findings and orders of Determination of its State Water Board or State Engineer, as the case may be, of the State of Oregon and to the respective Findings and Reports of the Referee of the State of Washington, filed in each case in which each of said decrees was rendered, and each of said Findings and orders of Determination and each of said Findings and Reports shall be admitted in evidence in this case as supplemental to and as a part of said respective decrees, as competent proof, so far as applicable affecting the individual rights specified in said decrees and affecting the respective rights of the two [fols. 74 & 75] states in this action.

Dated at Walla Walla, Washington, this 8th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Oregon; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; George T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 76] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 9—STATEMENT OF ISSUES AS TO WELLS

With respect to the relation of wells and of the rights of the users thereof for irrigation in the State of Oregon, to the stream system and to the rights of lower diverters therefrom for lands in the State of Washington, which were reserved for further treatment as item (5) of paragraph II in the stipulation of October 21, 1933, between the parties hereto:

The State of Washington contests the rights of the State of Oregon its officials, agents, citizens and water users, to grant state permits for and to use water from wells located in the area indicated on the official map, by virtue of said permits or otherwise, for irrigation without regard to the rights and requirements of the State of Washington, its citizens and water users, and raises the following issues with respect thereto, as affecting the rights of the respective states in this case.

I

The State of Washington alleges that the State of Oregon its officers and agents have sanctioned and permitted the use of, and the users of the waters of said wells have used and are using said waters for irrigation, in excess of the amounts necessary for said purpose; also without regard to the rights of the lands to water by surface diversion from the stream system; and further without regard to the rights of the diverters of water from the stream system to the benefits of the natural underground drainage to the [fol. 77] stream;

II

The State of Washington further alleges that the surface supply of water in the stream system during the summer irrigation season in each year is inadequate to satisfy the individual rights on said stream system according to their respective priorities in both states; that the use of water from said wells as aforesaid, results in a waste of water, intercepts a source of natural supply of the water of

the stream system, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users, of their just and equitable share of the waters of the stream system.

III

The State of Oregon challenges the legal sufficiency of the grounds of contest of the rights of the State of Oregon, its citizens and water users as set forth in paragraph I and II, and the issues raised therein with respect to the wells in the State of Oregon for the reasons that the same do not constitute a cause of action or sustain any rights of the State of Washington in this action.

IV

The State of Oregon denies each and every allegation set forth in the contest of the rights of the State of Oregon, its citizens and water users relative to the wells in the contested area in Oregon as set forth in paragraphs I and II above, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

V

The State of Oregon alleges that the wells in question were dug up- the lands owned by the citizens and water [fol. 78] users of the State of Oregon, and the waters in said wells were and are percolating waters in the soil of said land owners and belong entirely to said land owners under the laws of both the States of Oregon and Washington.

The State of Washington, its citizens and water users have no ownership in or access to said per*locating* waters, or any part thereof.

The State of Oregon issues permits for the use of wells and waters therein for irrigation, but only for the purpose of recording said use.

The ownership of said percolating waters and the right to the use thereof is a vested property right, and neither the State of Oregon nor the State of Washington has any right to regulate the use of such percolating waters under the laws of either State.

The wells in the State of Oregon and the water therein constitute no part of the Walla Walla River or its stream system, and the regulation of the use of said percolating waters is not within the jurisdiction of this Court.

The pumping of waters from said wells does not appreciably affect the supply of underground water, and in no way injures any citizen or water user of the State of Washington, or deprives them of any water. The use of said water from said wells for irrigation purposes immediately returns the same to the underground supply without waste and without dimunition except for less by evaporation and plant use.

The wells used for irrigation were dug and equipped at a large expense. The pumping of water therefrom, on account of the cost of power and the depreciation of equipment, costs each user large sums of money each year. Said expenditures regulate the extent of the use of said wells and said wells are used only for a beneficial use and as a supplemental supply, as and when the supply of surface water to the respective well owners from the streams and springs [fols. 79 & 80] diminishes, or is shut off on account of insufficient water in such streams and springs to supply the appropriations.

VI

The affirmative allegations on the part of the State of Oregon, above set forth, are deemed denied by the State of Washington, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington this 9th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunnningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant.
J. H. Van Winkle, Attorney General for the State of Oregon; George T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 81] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 10—STATEMENT OF ISSUES AS TO ADVERSE USE, ESTOPPEL, VESTED RIGHTS, TUM-A-LUM RIVER AND SEPARATE ADMINISTRATION IN OREGON

With respect to the issues which were reserved for further treatment as items (4) and (7) of paragraph "II" in the stipulation of October 21, 1933, between the parties hereto:

The State of Oregon contests the right of the State of Washington, its citizens and water users, to assert any right to the use of the waters of the Walla Walla River and its tributaries flowing in Oregon as against or prior to any appropriation in the State of Oregon by the citizens and water users of said state, for the following reasons, and alleges:

I

By appropriation, diversion and use the State of Oregon, its citizens and water users, have acquired by adverse use and prescription the right to the use of all or so much of the waters of the Walla Walla River and its tributaries flowing in Oregon as is required to supply the appropriations of the citizens and water users of said State according to the priorities and in the amounts and for the acreages as set forth in the decrees of the Courts of said State, and the permits issued by the State Engineer of said State; and said rights of said citizens and water users of said State are rights vested in the citizens and water users of the State of Oregon by said appropriation, diversion, adverse use and prescription without regard to any claim of [fol. 82] right or diversion or use on the part of any lower diverter from said stream in the State of Washington, and are prior in time and superior in right to any claimed rights of the State of Washington, its citizens and water users.

II

The State of Washington, its citizens and water users are estopped from asserting any right to the use of the waters

of the Walla Walla River and its tributaries flowing in Oregon as against or prior to any appropriation in the State of Oregon by the citizens and water users of said State, for that:

Believing and asserting that they were acting within their legal rights and relying upon the appropriations, diversions and use of water from said stream without regard to any claim of right of diversion or use on the part of any lower diverter from said stream in the State of Washington, the State of Oregon, its citizens and water users, have expended large sums of money in building diversions and distribution works; cultivating and planting the lands irrigated by the waters of said stream; building and establishing homes upon said lands; constructing other works, buildings and improvements of great value, and developing and building cities, industries, towns and communities all depending upon the use of said waters for their existence. A population of about 5,000 people have established their homes within the contested area and are dependent upon said development and the use of said water in Oregon. Concerning all the foregoing development the said State of Washington, its citizens and water users, at all times had notice and knowledge. And said State of Washington, its citizens and water users remained silent and permitted and acquiesced in the construction and erection of said works, buildings, improvements and developments, and expenditures of money, together with the diversion of water for such development without taking any steps to prevent the same, or making any protest against such use of said waters; or asserting any claim or right to the use of said [fol. 83] waters as against the State of Oregon, its citizens and water users; and now to permit the State of Washington, its citizens and water users to deprive the State of Oregon, its citizens and water users of said water, or any portion thereof, would make said lands barren and nonproductive, and render said improvements and development valueless to the irreparable damage and injury to the State of Oregon, its citizens and water users.

III

At all times from the beginning of irrigation in the State of Oregon, said State, its citizens and water users have distributed and used the waters of the Walla Walla River

and its tributaries for irrigation, domestic, power, and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and beginning with about the year 1888, such use and distribution of water has turned all water, not necessary for irrigation out of the Tum-A-Lum, into the Little Walla Walla River, and rendered the Tum-A-Lum River in Oregon dry during the months of July, August, and September of each year, and during a part of June and a part of October in many years; and all appropriations and diversions of water in the State of Washington made after said year of 1888 were made with notice and knowledge that said Tum-A-Lum River went dry each year during the said dry season, and subject to the limitation of water supply occasioned by said stream going dry during said season, and without the intention of claiming or asserting any right to have water flow in said Tum-A-Lum River during said dry season. That the Tum-A-Lum River in Oregon is a losing stream and its continuation in Washington, as the Walla Walla River, is a gaining stream, and at the time in each year the Tum-A-Lum River in Oregon goes dry there remains flowing in the Walla Walla River and its tributaries in Washington more than sufficient water to supply all claimed rights. Said Tum-A-Lum River is a stream with a bed from 100 to 1500 feet wide in a coarse, gravelly soil, through which the water readily sinks [fol. 84] and percolates, and to conduct water in said channel during said dry season would require the full flow of the stream and would cause an unreasonable waste.

## IV

In support of the foregoing propositions and adding thereto, the State of Oregon alleges that beginning in the year 1862 the citizens and water users of the State of Oregon began to appropriate, divert, and use water from the Walla Walla River in Oregon, and in each year thereafter made new appropriations and increased the amount of water so appropriated, diverted, and used, until in the year 1891 there were about 2552.62 acres of land irrigated in the contested area in Oregon for the irrigation of which substantially 100 second feet of water were diverted from said stream and beneficially used.

In the State of Washington at said time there were irrigated about 285 acres from the Walla Walla River, and about 177.69 acres from the East Little Walla Walla River, and about 546.90 acres from the West Little Walla Walla River.

In 1888 there were appropriated, diverted and used for power purposes in Oregon from the Walla Walla River 56.25 second feet of water, which said water was diverted from the Tum-A-Lum River and discharged into the Little Walla Walla River. From and after said appropriation the Tum-A-Lum has each year gone dry during the months of July, August, and September, and during a part of June and a part of October in many years.

In the year 1890 the City of Milton, Oregon, a municipal corporation, appropriated and began the diversion and use of 7.24 second feet of water from the Walla Walla River, which said water was used in the City of Milton, Oregon, for domestic, municipal, and irrigation purposes, and was not returned to said stream.

In 1892, and each year thereafter, the citizens and water users of the State of Oregon continued to make new appropriations and to increase the amount of water so used for [fol. 85] irrigation until the year 1903, when appropriations for irrigation use had been made for 6907.79 acres, which said appropriations have been fully completed and the water therefor diverted and used.

In 1898 an additional appropriation of 12.5 second feet of water from the Tum-A-Lum River for power purposes was made and said amount of water was thereupon and thereafter diverted from said Tum-A-Lum River and used for power purposes and discharged into the Little Walla Walla River.

In 1904, and each year thereafter, the citizens and water users of the State of Oregon continued to make new appropriations and to increase the amount of water used for irrigation purposes as shown in the agreed statement of facts in the tabulation of acreages irrigated.

All diversions made from the Walla Walla River at points North of the South line of Section 12, Township 5 North, Range 35 E. W. M., excepting not to exceed 13 second feet, diverted water away from the Tum-A-Lum River and either into the Little Walla Walla River in Oregon, or in a Northwesterly direction for irrigation purposes so

that none of said water diverted and used returned to said Tum-A-Lum River. Said diversions for irrigation, and from the Tum-A-Lum River to the Little Walla Walla River, have continued each and every year so that the Tum-A-Lum River has gone dry as aforesaid from and including the year 1888 to the present time.

The diversions, appropriations, and use of said water by each and all of the citizens and water users of the State of Oregon have at all times been open, continuous, notorious, adverse, and hostile to the citizens and water users of the State of Washington and the whole world; and said water was appropriated, diverted, and used under right and claim of right by the citizens and water users of the State of Oregon, and such diversion and use was well known to the citizens and water users of the State of Washington, and deprived them of the use of said water.

[fol. 86] Concerning all of the foregoing, the State of Washington, its citizens and water users, at all times have had notice and knowledge and remained silent without protest or assertion of any claim of right to the use of said water, and permitted and acquiesced in the diversion and use of the said water by the citizens and water users of the State of Oregon for a period long exceeding the statutory term of adverse use of ten years as fixed by the laws of both the States of Oregon and Washington.

The amount of water beneficially used upon said lands by said citizens and water users of the State of Oregon is and has been as set forth in the decrees of the Courts of Oregon adjudicating the rights of the streams involved in the said contested area, and the permits for the appropriation of water issued by the State Engineer of the State of Oregon.

During the period of irrigation from 1862 to the present time the citizens and water users of the State of Oregon have developed and improved by the use of said water the territory included in the contested area, as set forth in paragraph "II" above, concerning all of which the State of Washington, its citizens and water users, had notice and knowledge, and all of which would be rendered valueless should said lands be deprived of said water, to the irreparable damage and injury of the State of Oregon, its citizens and water users.

In the year 1905 a suit was commenced in the Circuit Court of the State of Oregon for Umatilla County for the

purpose of adjudicating the water rights of the Walla Walla River in the State of Oregon, and thereafter jurisdiction was acquired over all defendants and such proceedings were had that on the 19th day of September, 1910, a decree was entered in said Court fixing, determining, and adjudicating the rights of all parties to said suit to the use of the waters of the Walla Walla River. Immediately [fol. 87] thereafter the State of Oregon by and through its officers and water masters began the distribution of the waters of the Walla Walla River under and by virtue of, and in accordance with said decree. Thereafter an appeal was duly taken from said decree to the Supreme Court of the State of Oregon and such proceedings were had that a decree was rendered by said Supreme Court and the mandate returned to said Circuit Court of Umatilla County, Oregon, and a decree entered thereon on the 18th day of November, 1912. Continuously thereafter said water was distributed to the water users of the State of Oregon in accordance with said decree so entered upon said mandate until findings and Order of Determination were duly filed in the Circuit Court of the State of Oregon for Umatilla County by the State Engineer of Oregon in a proceeding under the Oregon Water Code of 1909 entitled: "In the Matter of Determination of the Relative Rights to the Use of the Waters of the Walla Walla River and Its Tributaries," etc. Thereafter such proceedings were duly taken that the Circuit Court of the State of Oregon for Umatilla County made and entered its decree upon the mandate of the Supreme Court of said State in said proceedings on the 25th day of February, 1933. Thereafter the water has been distributed by the State of Oregon through its officers and watermasters in accordance with the terms of said decree on the mandate.

The waters of the West Little Walla Walla River, called the West Prong in Oregon, have been distributed by the State of Oregon, its officers and water masters under and in accordance with the provisions of the decree entered in the Circuit Court of the State of Oregon for Umatilla County in "The Matter of the Determination of the Relative Rights to the use of the Waters of the West Prong of the Little Walla Walla River," etc., since the entry thereof on September 11, 1917.

After the adoption of the Water Code of Oregon in the year 1909, the State Engineer of Oregon has issued divers

permits for the appropriation of water in the contested [fol. 88] area, and as said permits were issued, the Water Master of Umatilla County, Oregon, has thereafter distributed water to the lands described in said permits in accordance with the terms thereof, and the laws of the State of Oregon.

The distribution of water by said water master, in accordance with said decrees and permits, has been for beneficial use for domestic, irrigation, power, and manufacturing purposes, and said water has been distributed by said water master from the Walla Walla River, West Little Walla Walla River, called West Prong in Oregon, and the East Little Walla Walla River, called East Prong in Oregon, as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and without regard to any claim of right of diversion or use on the part of any lower diverter from said stream in the State of Washington.

The citizens and water users of the State of Washington at all times have had notice and knowledge of the several decrees of the State of Oregon and of the distribution of water thereunder.

V.

The State of Washington reserves its rights under its motion to strike affirmative defenses heretofore filed in this action and reasserts its contention and claim thereunder, as against the allegations, contentions and claims of the State of Oregon as set forth in paragraphs I to IV both inclusive of the foregoing statement of issues herein.

VI.

The State of Washington challenges the legal sufficiency of each of the allegations, contentions and claims of the State of Oregon as set forth in paragraphs I to IV both inclusive of the foregoing statement of issues herein, as constituting a defense, or as sustaining any rights of the State of Oregon in this action.

VII.

The State of Washington denies each and every allega- [fol. 89] tion, contention and claim of the State of Oregon set forth in paragraphs I to IV, both inclusive of the

foregoing statement of issues herein, except as hereinafter admitted and except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case.

VIII.

The State of Washington further denies that the citizens and water users of the State of Oregon have any vested rights, as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to the waters of the Walla Walla River and its tributaries or to any part of the same at any place, in excess of the amounts reasonably necessary for their respective beneficial uses, according to their respective priorities set out in the decrees and abstracts of permits, referred to in paragraphs I and II of the Stipulation of October 21, 1933, between the parties hereto as supplemented by the stipulation of December 8th, 1933, between the same parties, and the State of Washington alleges that in regulating, supervising and apportioning the appropriation, diversion, distribution and use of the adjudicated individual rights of their citizens and water users, the State of Oregon, its officials, and agents have generally established, sanctioned and enforced and are generally establishing, sanctioning and enforcing the maximum per acre allotment set out in said decrees as the standard of distribution and apportionment for the lands in the related area regardless of their respective water requirements, and in some instances the State of Oregon, its officials and agents have apportioned and distributed said water to said lands in excess of the maximum water requirements named in said decrees for said respective lands, and said State, its officers and agents have not apportioned and distributed and are not apportioning and distributing said water on the principle of beneficial use, and by reason thereof the rights of the State of Washington, [fol. 90] its citizens and water users have been injured and impaired.

IX.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to the waters of the Walla

Walla River and its tributaries, or to any part of the same at any place, to satisfy rights in the related area in the State of Oregon, junior in priority, as set out in the decrees and abstracts of permits referred to in paragraphs I and II of the Stipulation of October 21, 1933, between the parties hereto, as supplemented by the Stipulation of December 8th, 1933, between the same parties, to that of the diverters and water users affected thereby in the State of Washington, and the State of Washington alleges that in regulating, supervising and apportioning the appropriation, diversion, distribution, and use of said individual rights of their citizens and water users, the State of Oregon, its officials, and agents have disregarded, and are disregarding, the rights of the State of Washington, and of the diverters and water users of water from the Walla Walla River and its tributaries in the State of Washington, by diverting, permitting the use of, apportioning, and distributing said water from the Walla Walla River and its tributaries to satisfy rights for lands in the related area in the State of Oregon, junior in priority, as set out in said decrees and abstracts of permits hereinabove mentioned, to that of the diverters and water users affected thereby in the State of Washington, and by reason thereof the rights of the State of Washington, its citizens and water users, have been injured and impaired.

X.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights, as against the State of Washington, its citizens and [fol. 91] water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise, to the waters of the Walla Walla River and its tributaries, or to any part of the same at any place, by appropriating, diverting, distributing, and using, during the summer irrigation season through the Little Walla Walla River, the entire surface supply of the main stream at that place to satisfy rights for lands in the related area in the State of Oregon, as set out in said decrees and abstracts of permits hereinabove mentioned, junior to those in the State of Washington, affected thereby, which junior rights in some instances are so used by reason of their place of use that the return

water therefrom does not reach the main stream and its tributaries above the principal diversions therefrom in the State of Washington, and the State of Washington alleges that in regulating, supervising, and apportioning the appropriation, diversion, distribution, and use of said water, as aforesaid, the State of Oregon, its officers and agents, have apportioned and distributed and are apportioning and distributing said water in the manner aforesaid and by reason thereof the rights of the State of Washington, its citizens and water users, have been injured and impaired.

XI.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise, to any water of the Walla Walla River and its tributaries by reason of the expenditure of any labor and money, or of any belief or reliance, on the part of the State of Oregon, its citizens and water users, or by reason of any silence, acquiescense, action, or failure of action on the part of the State of Washington, its citizens and water users, all as set forth and claimed in paragraph II herein, and the State of Washington al- [fol. 92] leges that said State, its citizens and water users, have also belie ed and asserted that they were and have been acting within their legal rights; have also relied upon their appropriations, diversions, and use of water, and have expended large sums of money and labor for purposes similar to that specified in said paragraph II herein, and by reason thereof, as well as for other reasons set forth herein, the State of Washington, its citizens and water users, are entitled to a just and equitable share of the waters of said stream system.

XII.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to any water of the Walla Walla River and its tributaries by reason of the contention and alleged claim set out in paragraph III herein, that at all

times from the beginning of irrigation in the State of Oregon, said State, its citizens and water users, have distributed and used said water for irrigation, domestic, power, and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington; and the State of Washington alleges that the Walla Walla River and its tributaries constitute an interstate stream system; that the natural downward course of water is continuous through the same; that the natural loss of water in the Tum-A-Lum section of the stream is not excessive, the gradient in the same being approximately 60 feet to the mile; that the water naturally disappearing in the surface of said section remains in the stream system, and contributes to the supply of the water of the river and its tributaries in the State of Washington; that the State of Oregon, its citizens and water users, do not, and cannot, legally have, as against the State of Washington, its citizens and water users, the exclusive right to the waters of said stream system or [fols. 93 & 94] any part of the same in the State of Oregon; that the surface supply of water in the stream system during the summer irrigation season in each year is inadequate to satisfy all the individual rights on said stream system according to their respective priorities in both states; that the distribution and use of the waters of the Walla Walla River and its tributaries by the State of Oregon, its officers, agents, citizens, and water users, as a stream system wholly in Oregon, separate and independent of any part of said system in the State of Washington, to the extent to which the same may in any year have been accomplished, without regard to the rights of citizens and water users of the State of Washington, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users, of their just and equitable share of the waters of the stream system.

## XIII

The State of Washington alleges that as against the State of Washington, its citizens and water users, the decrees of the Courts of the State of Oregon, and the permits of the State Engineer of said state, neither determine nor fix any rights, except as admitted in this cause.

XIV

The affirmative allegations on the part of the State of Washington above set forth are deemed denied by the State of Oregon, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington, this 9th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for Washington. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon.

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[fol. 95] In Supreme Court of the United States

[Title omitted]

Stipulation No. 11—Statement of Agreed Facts and as to Rights by Appropriation

The following facts are stipulated and agreed:

I

Originally Washington was a part of what was popularly called the Oregon country. At this time the United States, Great Britain, Spain and Russia made claim to all or parts of this region. By treaty between the United States and Spain, February 22, 1819, Spain ceded to the United States all her rights in this region, north of the forty-second parallel. (8 U. S. Stat. L. 252.) By treaty with the United States, April 5, 1824, Russia relinquished her claims to this territory. (8 U. S. Stat. L. 302.) By treaty of October 20, 1818, the United States and Great Britain agreed that for a period of ten years the territory on the northwest coast of America westward of the Stony Mountains (Rocky Mountains) should be free and open to the vessels, citizens and subjects of both powers. (8 U. S. Stat. L. 248.) This treaty was indefinitely continued in force by another treaty between the same parties on August 6, 1827, which pro-

[fol. 96] vided that either party, at any time after October 20, 1828, might annul it by giving twelve months' notice to the other party. (8 U. S. Stat. L. 360.) By joint resolution of the senate and house of representatives, under date of April 27, 1846, the President of the United States was authorized to give Great Britain the notice that was required for the abrogation of the treaty of August 6, 1827. (9 U. S. Stat. L. 109.) The joint occupation of the territory between the Rocky Mountains and the Pacific coast was finally terminated and the boundary line between the possessions of Great Britain and the United States was fixed as the forty-ninth parallel of north latitude, Great Britain retaining the island of Vancouver, by treaty June 15, 1846. (9 U. S. Stat. L. 869.)

On May 2, 1843 the inhabitants of the Oregon Country which was a somewhat indefinite term for the area drained by the Columbia River and lying west of the summit of the Rocky Mountains, met at Champoeg and organized a provisional government under the suzerainty of the United States. On July 5, 1845, representatives of the people again met and adopted what is known as the Organic Law of Oregon (Rev. Stat. Territory of Oregon, P. 33). This act was submitted to the people and ratified by popular vote on July 26, 1845.

All the territory of the United States lying west of the summit of the Rocky Mountains, north of the forty-second degree of north latitude was organized into the territory of Oregon, August 14, 1848. (9 U. S. Stat. L. 323.) The territory of Washington was created out of part of the territory of Oregon by act of Congress, March 2, 1853. The territory of Washington included the present State of Washington and that portion of Idaho and Montana which is north of the forty-sixth parallel and west of the Rocky Mountains. (10 U. S. Stat. L. 172.) The constitution of Oregon was adopted by convention on September 18, 1857. This constitution so adopted became effective upon the admission of the State of Oregon to the Union by Act of Congress passed February 14, 1859, (11 Stat. L. 383) and by the acceptance by the State of the propositions submitted by Congress, which propositions were approved [fol. 97] by the Legislative Assembly of Oregon on June 3, 1859 (Ore. Code 1930, PP. 31-37, 63 et seq.). The present boundaries of the State of Oregon were then fixed and all the remainder of the then territory of Oregon

was made a part of the territory of Washington. (11 U. S. Stat. L. 383, 384.)

Under date of March 3, 1863 the territory of Idaho, with boundaries the same as the present State of Idaho, was organized. (12 U. S. Stat. L. 808.) On February 22, 1889 the Enabling Act, authorizing the Dakotas, Montana and Washington to form constitutions, was approved. The boundaries then fixed for the State of Washington were substantially the same as now existing. (Rem. Rev. Stats. of Wash. Vol. 1, P. 331.) The constitution of the State of Washington was adopted by an election held in the state on October 1, 1889 and on November 11, 1889, the President of the United States proclaimed the admission of the state into the Union. (Rem. Rev. Stat. of Wash. Vol. 1, P. 347.)

II

All the lands in the drainage area of the Walla Walla River in both states were originally public lands of the United States and that part of these lands now held in private ownership has been generally acquired under the public land laws of the United States; the lands along the upper reaches of the river were, at the time of the respective segregations from the public domain of the lands lower down on the stream system, and have been since, public lands of the United States and are now a part of the Umatilla National Forest Reserve.

III

It is agreed that, for the purposes of this case, the individual rights of the respective land owners and water users concerned in both states are governed by the doctrine of appropriation and that no issue of riparian ownership as to such individual rights shall be raised in this case by either state.

[fols. 98 & 99] Dated this 14th day of January, 1934.

G. W. Hamilton, Attorney General for the State of Wash.; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Wash., Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 100] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 12—RELATING TO EXHIBITS

It is hereby stipulated by and between the undersigned counsel for the respective states:

That each and all of the exhibits introduced in evidence before the Special Master at the hearing held at Walla Walla, Washington, March 26, 1934 to and including April 6, 1934, or any part of said exhibits, may be considered by said Special Master in making his findings, conclusions and recommendations for a decree in this cause without the incorporation of said exhibits or any of them in the briefs of counsel submitted in the cause prior to the making of said findings, conclusions and recommendations, provided that the provisions of this stipulation shall be subject, and without prejudice, to any objection made by counsel for either party to the case, to the introduction of any of said exhibits in evidence, and shall be subject, and without prejudice, to any motion made by counsel to strike any of said exhibits from the evidence in the case, and provided [fols. 101 & 102] further, that nothing herein contained shall be construed as preventing either party from incorporating any of said exhibits or any part of the same in its brief, as its counsel may deem proper for the support of the arguments submitted therein or for the convenience of the Court and Special Master.

Dated this 25th day of May, 1934.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 103] WASHINGTON EXHIBIT No. 16

United States Department of the Interior, Geological Survey, Washington

Ground water in the Walla Walla Basin, Oregon-Washington

Lodi, California, October 30, 1933.

[fol. 104] Department of the Interior, United States Geological Survey

Ground Water in the Walla Walla Basin, Oregon-Washington

By A. M. Piper, T. W. Robinson, and H. E. Thomas

Prepared in cooperation between the United States Geological Survey, the Oregon State Agricultural Experiment Station, the Oregon Department of Water Resources, and the Washington Department of Conservation and Development.

[Stamp:] U. S. Geological Survey. Advance Data-Subject to Revision. Arthur M. Piper, Geologist. Released A. M. P. Oct. 30, 1933. Original data by —— ——. Compiled by —— ——. Checked by H. E. T.

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[fol. 109] Ground Water in the Walla Walla Basin, Oregon-Washington

By A. M. Piper, T. W. Robinson, and H. E. Thomas

## Introduction

### Location and Extent of the Area

The area described in this report comprises parts of Umatilla County, in northeastern Oregon, and of Walla Walla County, in southeastern Washington, and covers 295 square miles in Ts. 5 to 8 N., Rs. 32 to 37 E., Willamette meridian; it covers the central part of the drainage basin of the Walla Walla River, which is an interstate stream and a minor tributary of the Columbia River. The location of the area with respect to the boundaries of the two States is shown by the following index map (fig. 1).

Figure 1.—Index map of Oregon and Washington showing location of the Walla Walla Basin (shaded area).

Walla Walla, Washington, which in 1930 had a population of 15,976, is the largest city in the area and is the commercial center of the surrounding region; it is also the seat of Walla Walla County, Milton, with a population of 1,576, and Freewater, population 732, are the principal communities in the part of the area which lies in Oregon.

(Here follows map, side folio 110.)

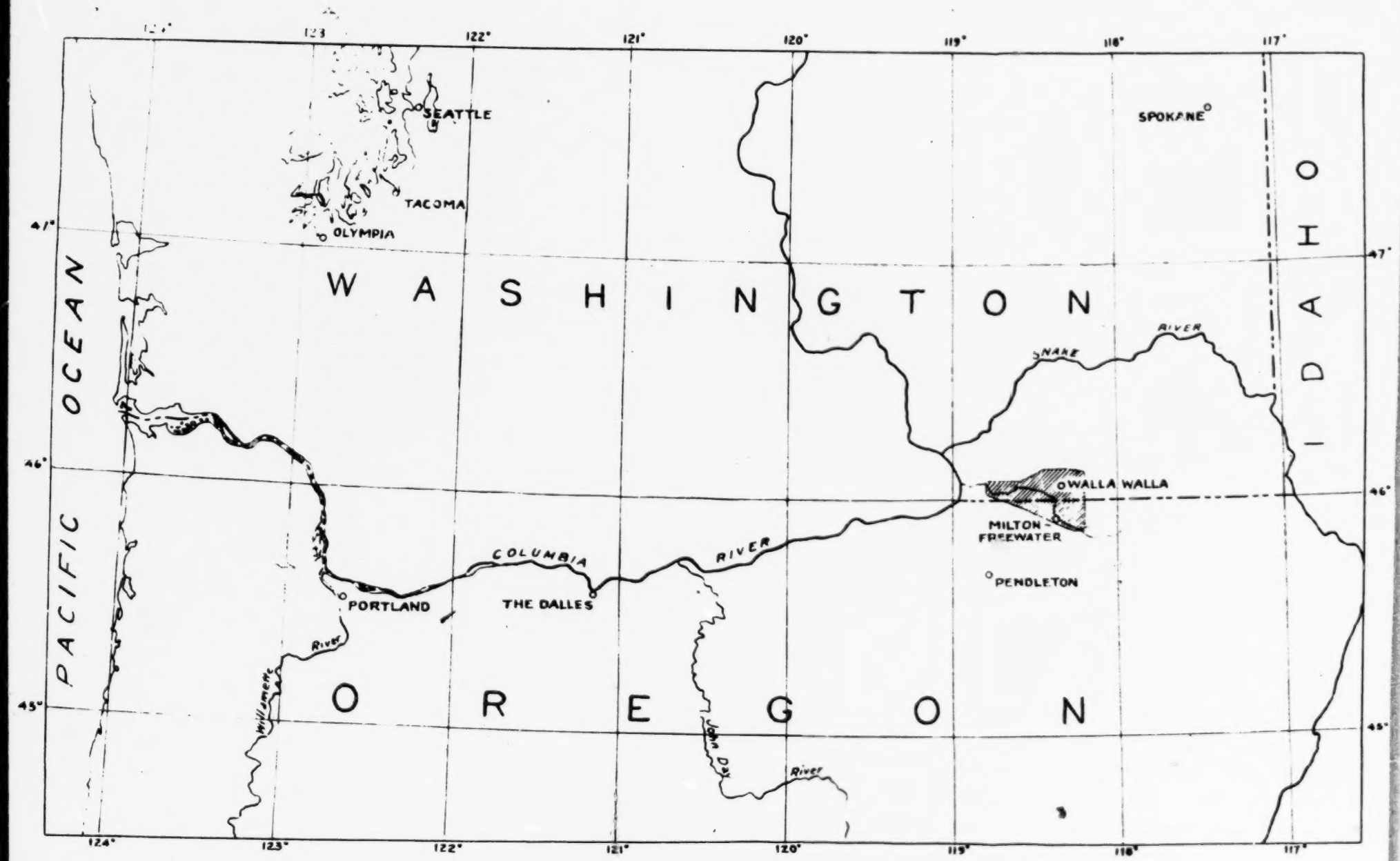



Figure 1. Map of Oregon and Washington showing location of the Walla Walla Basin (shaded area).

## [fol. 111] Purpose, Scope, and History of the Investigation

The investigation whose findings are the basis of this report is one item in a broader program of investigation which seeks data upon which to adju-cate the rights of the States of Oregon and Washington to the water of the Walla Walla River and its tributaries. The problems of adjudication and allocation of the surface water are complex, the more so because irrigation of the diversified fruit, vegetable, and forage crops has drawn so heavily upon the river in recent years that recourse has been taken to pumping from wells to supplement the supply of water during periods of minimum stream flow. Because of stringencies of time and of available funds the investigation was undertaken with limited objectives, namely: to establish the relation between the Walla Walla River and the body of ground water which supplies the irrigation wells and certain perennial springs on the valley plain in the vicinity of Milton and Freewater, and to ascertain the general ground water conditions of the area insofar as they might influence that relation.

The investigation was made by the United States Geological Survey acting in cooperation with the Oregon Agricultural Experiment Station, the Oregon Department of Water Resources, the Umatilla County Court (Oregon), and the Washington Department of Conservation and Development. Its technical direction was in the hands of O. E. Meinzer, geologist in charge of the division of ground water in the Federal organization.

[fol. 112] A reconnaissance of the area was made by the senior writer (Piper) August 19-23, 1932, when the potential investigation was conceived as a basis for a comprehensive allocation of all the surface water and ground water resources of the area. At that time 13 observation wells were selected in key locations and measurements of the depth to water were made. In November and December of that year, 23 additional observation wells were selected by M. R. Lewis for the Agricultural Experiment Station and levels were run to all 36 wells by D. G. Glass for the Oregon Department of Water Resources. Between December, 1932, and the following April, measurements of the depth to water in these observation wells were made at irregular

frequency by W. C. Mason, assistant watermaster (Umatilla County) and for the Department of Water Resources. In this work the Geological Survey acted as adviser. On May 1, 1933, when the cooperative investigation was undertaken in its limited scope, the senior writer began the geologic map of the basin (Pl. 1) and T. W. Robinson undertook the study of hydrologic features under his supervision. Beginning July 1, H. E. Thomas was assigned to complete the geologic map. Intensive field work was terminated August 3, 1933, but routine observations on wells and springs are being continued by W. C. Mason and C. E. Douglass, cooperative observers representing the Umatilla County Court and the Washington Department of Conservation and Development, respectively.

[fol. 113] The term of the investigation—a year beginning with the preliminary reconnaissance and only three months coordinated study in the field—has permitted observations of the behavior of the surface water and ground water through only a part of one annual cycle. Thus, only tentative conclusions are drawn as this preliminary report is being prepared (August-September, 1933). These conclusions can be tested only by systematic observation of critical hydrologic features during a term of years.

## Acknowledgments

The writers acknowledge with gratitude the cordial cooperation of the residents of the basin, without which little could have been accomplished. Commendable service was rendered by the following persons who, without compensation, kept records for several months from float gages installed in their wells: E. C. Babcock, Sam Givens, O. K. Goodman, D. Goodwin, U. H. Hayden, Walter Herman, Louis Howton, John Irons, J. D. Knobel, John Pitman, Alpha Reese, A. A. Durand, A. L. Ebersol, and Haig Brothers, well drillers, contributed records of wells drilled by them, and discussed the conditions pertaining to the occurrence of ground water in the Walla Walla Basin.

[fol. 114] The Water Resources Department, of Oregon, and the Department of Conservation and Development, of Washington, have contributed freely of their data gathered in other investigations in the area and have co-operated with the Geological Survey to establish a coordinated program of observations which would meet the needs

of each agency without duplication of effort. The Oregon agency has been represented by E. K. Humphrey, assistant to the State Engineer; the Washington agency by Dr. J. G. Woodburn of the Washington State College, and by C. E. Douglass, hydrographer. The assistant watermaster, Mr. Mason, has contributed freely from his intimate knowledge of the district about Milton and Freewater and has rendered competent assistance in the field.

[fol. 115] Climate

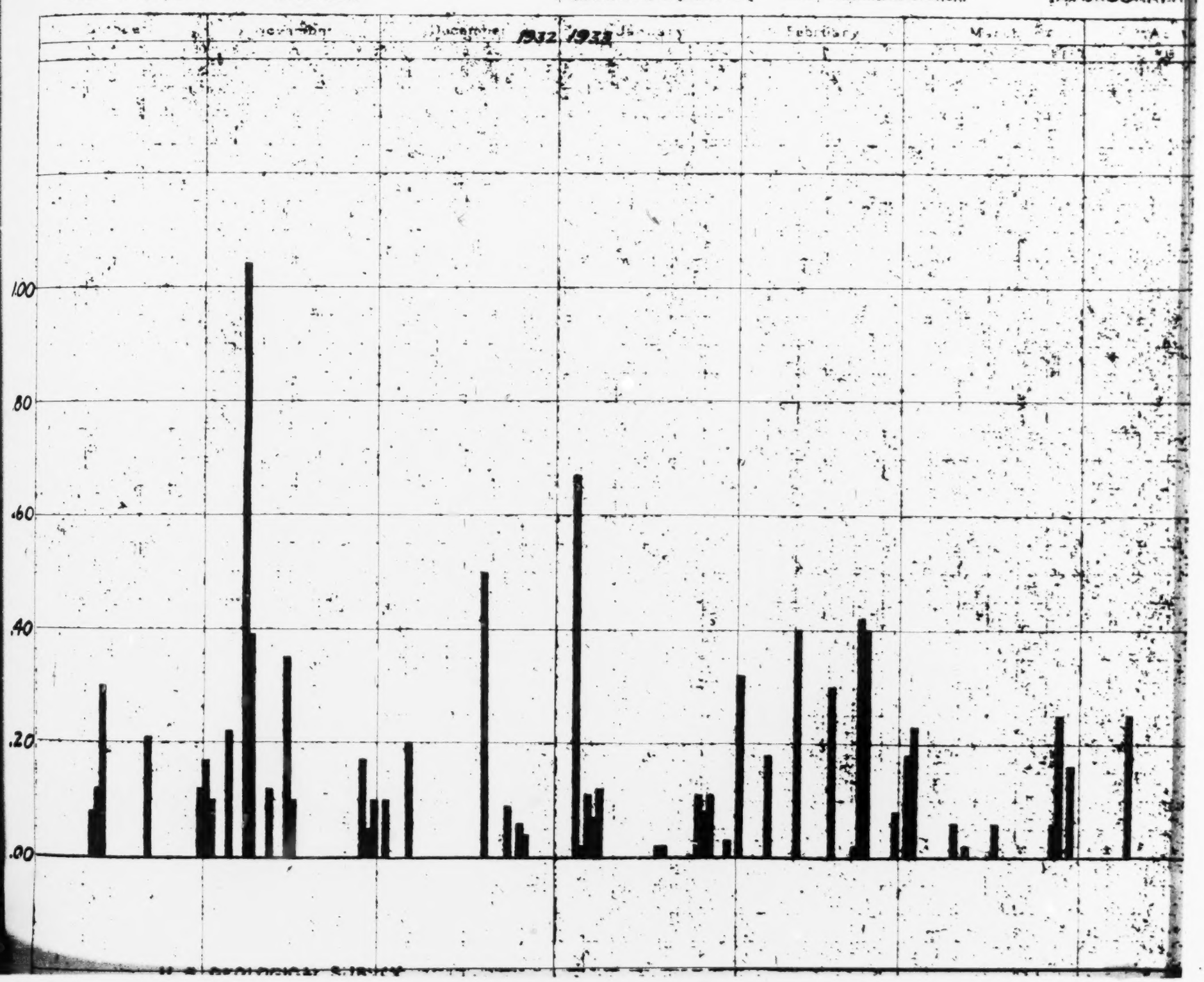
The Walla Walla Basin has a semi-arid climate, with warm dry summers and cold wet winters. At Milton the mean temperature in the warmest month, which is generally July, is 73.9° F.; in the coldest month, which generally is January, it is 31.0° F. The mean annual temperature is 52.6° F. In the 11-year period 1922–1932 the highest recorded temperature was 107° F., and the lowest —15° F. In this same period the latest killing frost in the spring has ranged from March 9 to May 9; the earliest killing frost in the autumn has ranged from September 21 to November 12. The average growing season or frost-free period is 193 days.

As the following table shows, the average rainfall at Milton in the climatic year (October 1 to September 30) during the 11-year period 1922–1932 is 12.99 inches, of which 1.54 inches falls during the three summer months (July to September). The daily rainfall (or snowfall) at Milton in the climatic year 1932–33 is shown on an accompanying diagram (fig. 2).

Figure 2.—Rainfall at Milton, Oregon, 1932–33.

(Here follows 1 photo, side folio 116.)

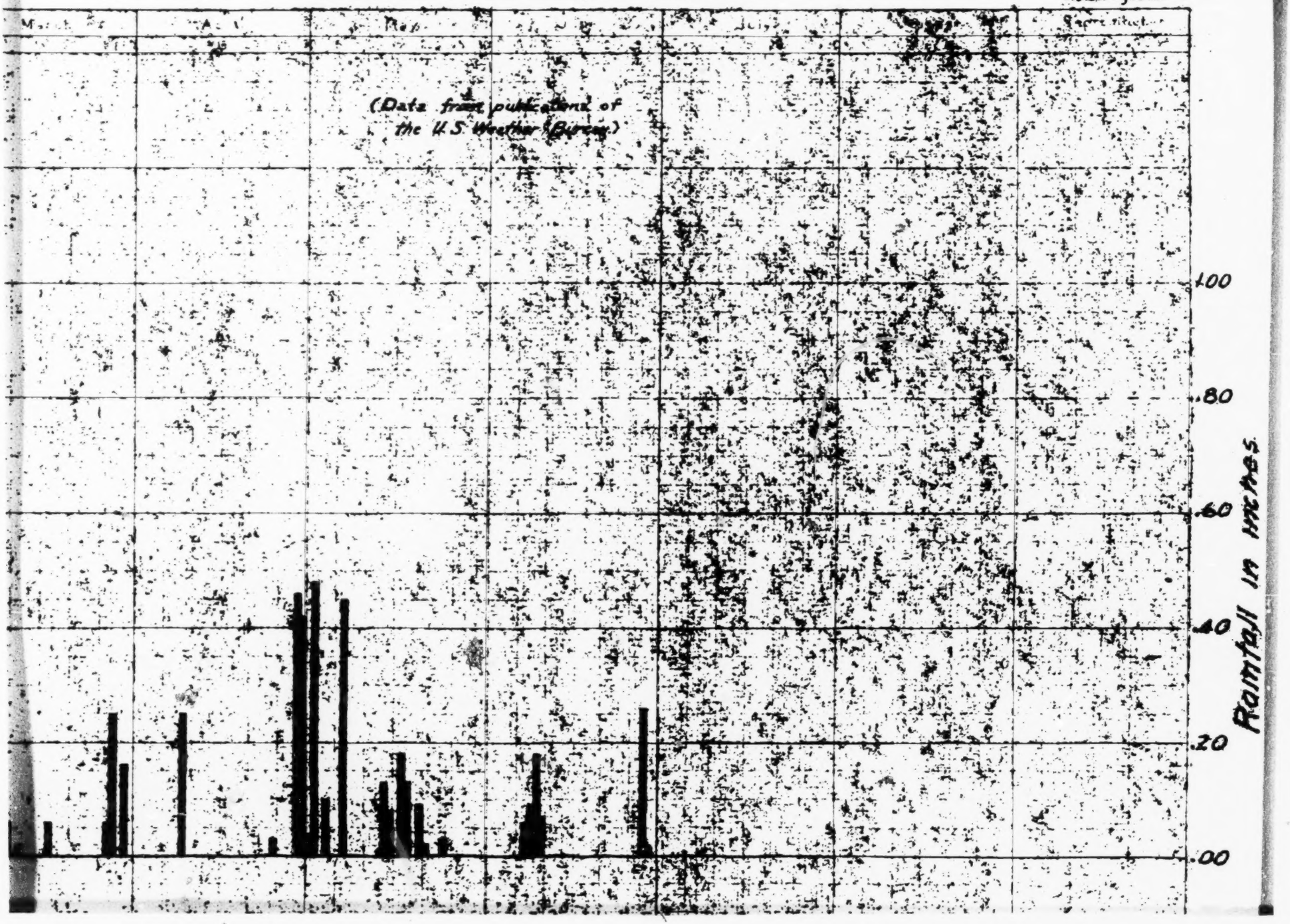
DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES BRANCH HYDROGRAPH

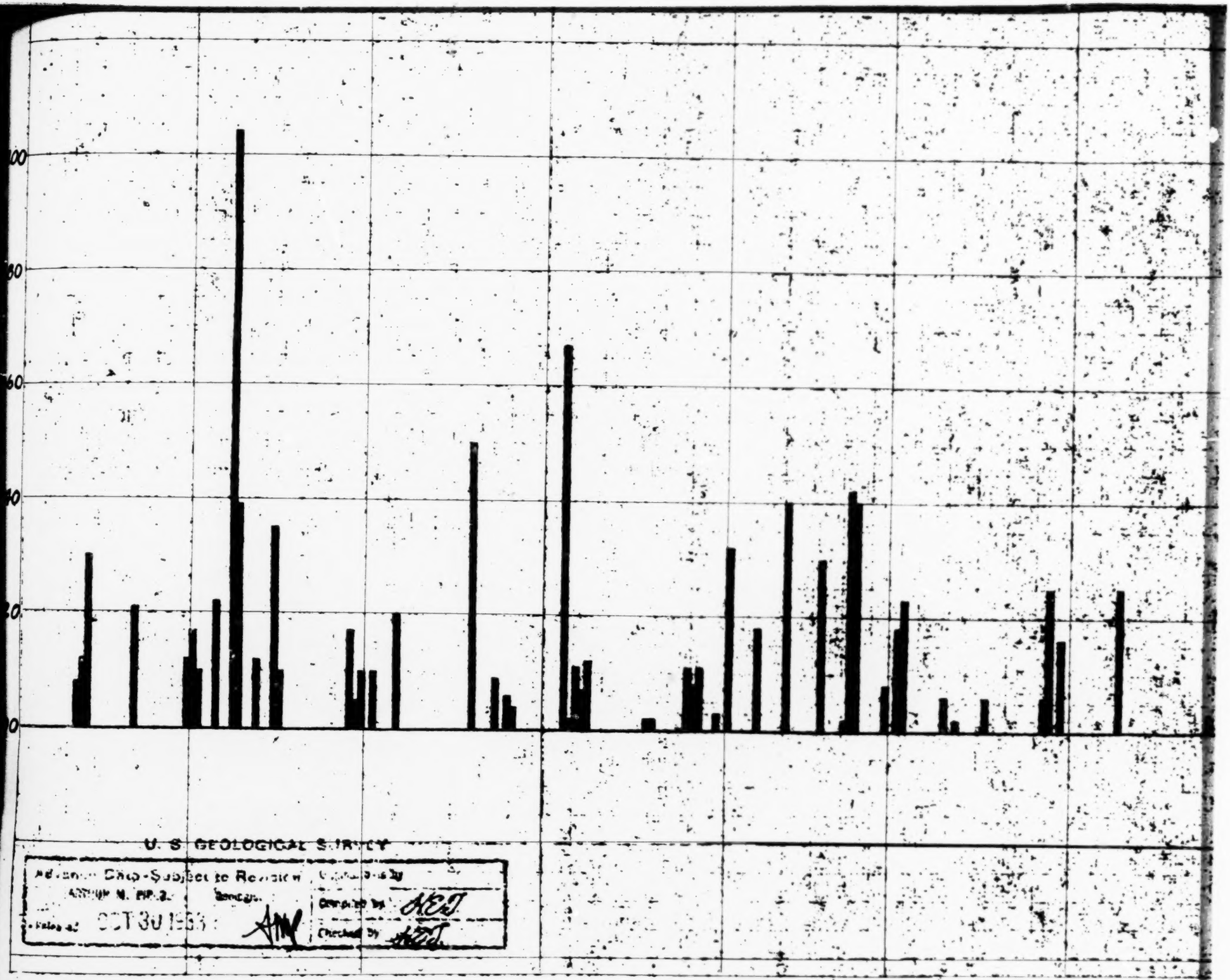


HYDROGRAPH FOR Rainfall at Milton-Oregon 1932-33

Washington

Fig. Figure 2

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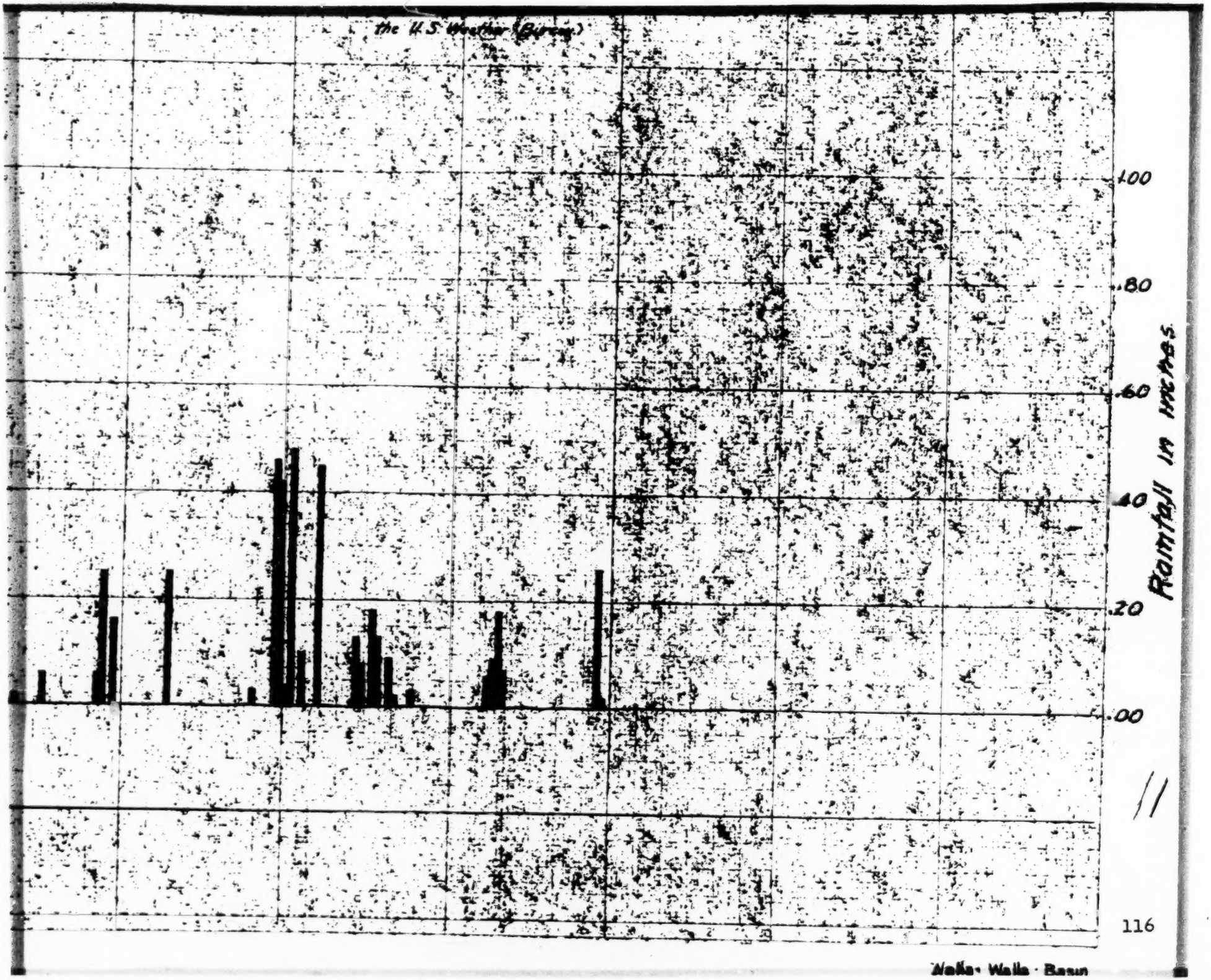

the U.S. Weather Bureau
100
80
60
40
20
00
Rainfall in inches.
11
116
Walla Walla Basin

6—11-Orig.

fol. 117]

Monthly and Annual Rainfall at Milton, Oregon, 1922–1933*

| Year (Oct. 1 to Sept. 30) | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1921–22 | 0.55 | 4.14 | 1.29 | 1.06 | 0.73 | 0.44 | 0.85 | 0.26 | 0.74 | 0.02 | 1.00 | 0.20 | 11.28 |
| 1922–23 | .63 | .73 | 2.19 | .87 | .60 | .00 | .55 | 1.14 | 1.82 | .16 | .81 | .21 | 9.71 |
| 1923–24 | 2.75 | .55 | .99 | .68 | 2.04 | .69 | .10 | .01 | .70 | .45 | 1.05 | .82 | 10.83 |
| 1924–25 | .95 | 2.92 | 1.66 | .83 | .86 | .79 | 1.20 | 2.27 | .27 | T | .47 | .33 | 12.55 |
| 1925–26 | .12 | .96 | 2.36 | 1.65 | 2.59 | 1.17 | 1.05 | 1.42 | 1.26 | T | 1.41 | 1.06 | 15.05 |
| 1926–27 | 1.83 | 4.39 | 1.25 | 3.49 | 2.19 | 1.47 | .26 | .88 | 2.36 | .10 | .34 | 4.64 | 23.20 |
| 1927–28 | 1.19 | 2.37 | .08 | 2.11 | .27 | 1.72 | 1.06 | .03 | .61 | .58 | .09 | .88 | 10.99 |
| 1928–29 | 1.16 | .79 | 1.42 | 3.75 | .00 | 1.00 | .38 | .97 | 1.96 | T | .05 | .58 | 12.06 |
| 1929–30 | .43 | .23 | 3.17 | .79 | 1.04 | .56 | .93 | 2.47 | .66 | .05 | .07 | .91 | 11.31 |
| 1930–31 | 1.98 | 1.65 | 1.08 | 1.63 | .86 | 2.66 | 1.08 | T | 1.44 | .00 | .00 | .25 | 12.63 |
| 1931–32 | 1.18 | 2.15 | 2.43 | 1.12 | 1.11 | 2.11 | .97 | 1.57 | .23 | .40 | T | T | 13.27 |
| 1932–33 | .83 | 2.81 | .99 | 1.41 | 2.12 | 1.02 | 1.16 | 1.73 | .68 | .00 | .... | .... | ..... |
| Average | 1.16 | 1.90 | 1.72 | 1.63 | 1.12 | 1.15 | 0.58 | 1.00 | 1.10 | 0.16 | 0.48 | 0.90 | 12.99 |

* Data from publications of the U. S. Weather Bureau.

[fol. 118] Land Forms and Drainage

## General Features

The area considered in this report lies in the central-eastern part of the Walla Walla plateau section of the Columbia Plateau physiographic province. The western edge of the adjacent Blue Mountains section is about 10 miles east of the city of Walla Walla. Within this area the Walla Walla plateau has moderate relief, ranging from 1,900 feet along the flank of the Blue Mountains to 400 feet in the river bottoms at the western edge of the area. The topography of the region is mature: the only extensive flat areas are the flood plains and terraces developed by the larger streams. For the most part the upland areas comprise subparallel ridges trending N. 20° E., separated by V-shaped valleys which commonly are 50 to 300 feet deep. These ridges and slopes have a deep fertile soil, and are largely devoted to wheat raising.

[fol. 119] The Walla Walla River, the principal stream of the area and its environs, heads on the west flank of the Blue Mountains and enters the southeastern part of the area through a rock-walled canyon. From Milton these rock walls diverge at a wide angle which is open toward the north and west, and which incloses a broad area floored by stream deposits. Mill Creek, which also rises on the west flank of the Blue Mountains and flows westward through the city of Walla Walla to join the Walla Walla River in the central part of the area, has developed a corresponding area of alluviation which merges into that along the main stream. Thus, the Walla Walla valley—a term which is applied in this report only to the area occupied by the unconsolidated deposits laid down by Mill Creek and by the Walla Walla River—is rudely triangular, and from apices in the canyons of the two streams converges westward to the head of the gorge which begins near Reese, 20 miles to the west. Near Whitman, where the Walla Walla River and Mill Creek join, the valley is 10 miles wide; at Touchet it is about 4 miles in width.

[fol. 120] Land Forms

The Walla Walla valley comprises three distinct physiographic divisions. In order of decreasing age these are: the Gardena terrace, whose remnants are as much as 120

feet above the flood plains of the Walla Walla River and tributaries; the low terrace, whose remnants parallel the flood plains and are commonly less than 20 feet above them; and, finally, the alluvial fans of the Walla Walla River and Mill Creek and the flood plains of the river and its several tributaries. The extent of each of these constructional forms is indicated by the areal map of the corresponding sediments (Pl. 1).

Plate 1.—Geologic map of the Walla Walla Basin, showing location of typical wells and springs.

[fol. 121] The Gardena terrace is now thoroughly dissected and is represented by numerous remnants which range in size from flats 18 miles in length to hillocks 100 yards across. The most prominent remnant lies south of the Walla Walla River in the western part of the area; upon it are situated the Gardena irrigated tracts from which this land form is named. From the highway to the north, between Lowden and Touchet, its nearly-level tree-covered surface stands out sharply against a background of rolling grassy slopes. This remnant stands 120 feet above the flood plain of the river southeast of Touchet and 40 feet above the flood plain of Dry Creek (in Oregon) 10 miles to the east. It flanks the south wall of the valley for a distance of 12 miles. The western end of this remnant forms a narrow prong which extends into the rock-walled gorge of the Walla Walla River nearly as far as Reese. Still farther downstream remnants of the Gardena terrace form narrow shelves along the sides of this gorge. It is concluded from these remnants that the outlet of the Walla Walla River basin has occupied the site of the present gorge since the beginning of the epoch in which the Gardena terrace was constructed; indeed it may have occupied that position for a much longer time.

[fol. 122] A larger remnant of the Gardena terrace lies north of Walla Walla, is 18 miles long and as much as 3 miles wide, and stands 25 to 100 feet above the flood plain. Its western part has been intricately dissected by short tributaries of Dry Creek (in Washington) and by short tributaries of the Walla Walla River. The eastern part of this remnant is clearly part of an ancient fan of Mill Creek, whose apex was near the present site of the settlement named Tracy, 4 miles upstream from the apex of the present alluvial fan. A corresponding ancient fan along the

Walla Walla River is suggested by a remnant which extends upstream to the mouth of the canyon east of Milton.

In the central part of the basin, the terrace has been thoroughly dissected by the several distributaries of the Walla Walla River and of Mill Creek, which have left long narrow remnants. In many places the summits of these linear remnants are distinctly flat and seem to preserve the initial form of the constructed terrace. Elsewhere the summits are rolling.

In general, the gradient of the Gardena terrace is slightly less than that of the adjacent flood plain. Remnants in the western part of the area are 100 to 120 feet above the flood plain and slope westward less than 20 feet to the mile; those in the eastern part of the area stand only 10 to 25 feet above the fans of the Walla Walla River and of Mill Creek; they decline westward 60 to 75 feet in a mile.

[fol. 123] The form of the Gardena terrace before it was dissected can be reconstructed hypothetically by an imaginary surface which would coincide with the extensive flat remnants and would span the present drains which are intrenched below those flats. Such an imaginary surface comprises two conical forms, which have apices in the canyon mouths of the Walla Walla River and of Mill Creek and which by mutual interference merge toward the west into a relatively flat westward-sloping plain. Thus, its reconstructed form is that of a constructed alluvial surface. The conical form of the surface is best preserved by the terrace remnant which lies north of Mill Creek between Walla Walla and Tracy (Pl. 1). Here the generalized contours of the present land surface are arcuate and concentric about Tracy[1]; they descend from 1,500 feet above sea level near Tracy to 1,000 feet above sea level due north of Walla Walla, that is, in a distance of 7 miles, or about 70 feet to the mile. The cone, or presumptive fan, whose apex is in the canyon of the Walla Walla River at Milton is poorly preserved but seems to be about 1,100 feet above sea level at Milton and to descend toward the northwest about as steeply as the cone north of Mill Creek. At the longitude of Whitman and Umapine the hypothetical surface would be nearly plane, would stand 700 feet above sea level, and would slope westward 15 to 20 feet in a mile. Still farther

[1] U. S. Geol. Survey, Topog. Atlas, Walla Walla quadrangle, scale 1:125,000, 1921.

west the form of the surface is poorly defined but it seems to continue with about the same gradient to and beyond Touchet and Gardena. At Touchet it would be about 550 feet above sea level.

[fol. 124] The low terrace is inconspicuous; it is represented by remnants which are less than a mile wide and as much as 8 miles long, and which border the flood plains. To this terrace the graded portions of several of the smaller tributary creeks are adjusted. Remnants of the low terrace are readily discernible in the western part of the area, where they are 5 to 20 feet above the flood plain. Upstream, however, they become lower and less distinct, and commonly merge into the flood plain without any topographic break. Individual remnants decline westward somewhat less steeply than does the flood plain; for small distances the two may differ in slope as much as 5 feet in a mile. In spite of this steeper gradient, the low terrace is nowhere more than 20 feet above the present flood plain in a distance of 12 to 15 miles along the river. It seems probable, therefore, that this physiographic division includes the products of several substages which are very little older than the flood plains; two such substages, one 5 to 8 feet higher than the other, have been recognized locally in the vicinity of Umapine, Oregon.

[fol. 125] The alluvial fan of the Walla Walla River slopes northward from an apex at the mouth of the rock-walled canyon at Milton, is about 4 miles long, and is about 4 miles wide along its outer margin. At its apex the fan stands about 1,070 feet above sea level; from this altitude it descends about 60 feet in a mile and stands about 850 feet above sea level along its outer margin. This feature, hereafter designated the Milton-Freewater fan, is delimited to the north and west by the upstream ends of several remnants of the Gardena and low terraces; the main channel of the Walla Walla River, locally called the Tumalum River between Freewater and the Oregon-Washington boundary, follows its eastern margin. Upstream from Milton for several miles the canyon of the river is floored by a flood plain 0.1 to 0.5 mile wide, this plain being correlative with the alluvial fan. Below the fan, the Walla Walla River and its several distributaries have developed flood plains which generally are less than 0.5 mile wide, and which are separated or bordered by long narrow remnants of the low terrace or by higher remnants of the Gardena terrace. About

2 miles west of Touchet, that is, near the western terminus of the valley, the flood plain of the river becomes discontinuous, and comprises narrow flats which floor a V-shaped valley.

[fol. 126] The alluvial fan of Mill Creek is less prominent than the fan of the Walla Walla River at Milton. This fan originates at an apex about 2 miles east of Walla Walla and is roughly delimited by Yellowhawk Creek on the south, by the main channel of Mill Creek on the north, and by several narrow remnants of the Gardena terrace on the west. It attains a maximum width of 1½ miles at Walla Walla, which is built almost entirely on the fan. Both above and below the fan, the flood plain of Mill Creek averages 0.5 mile wide. Below the fan, the several distributaries of the creek are likewise bordered by flood plains.

The flood plains of other tributaries of the Walla Walla River—the Touchet River, Dry Creek, Pine Creek, and Mud Creek—likewise have flood plains which generally are less than half a mile wide.

[fol. 127] Drainage

The principal stream of the region, the Walla Walla River, comprises two forks which rise in the Blue Mountains, and join about 5 miles southeast of Milton (Pl. 2. A) near the southeast corner of the area represented by the

Plate 2.—A. Confluence of the North Fork and the South Fork of the Walla Walla River, 5 miles southeast of Milton, Oregon.

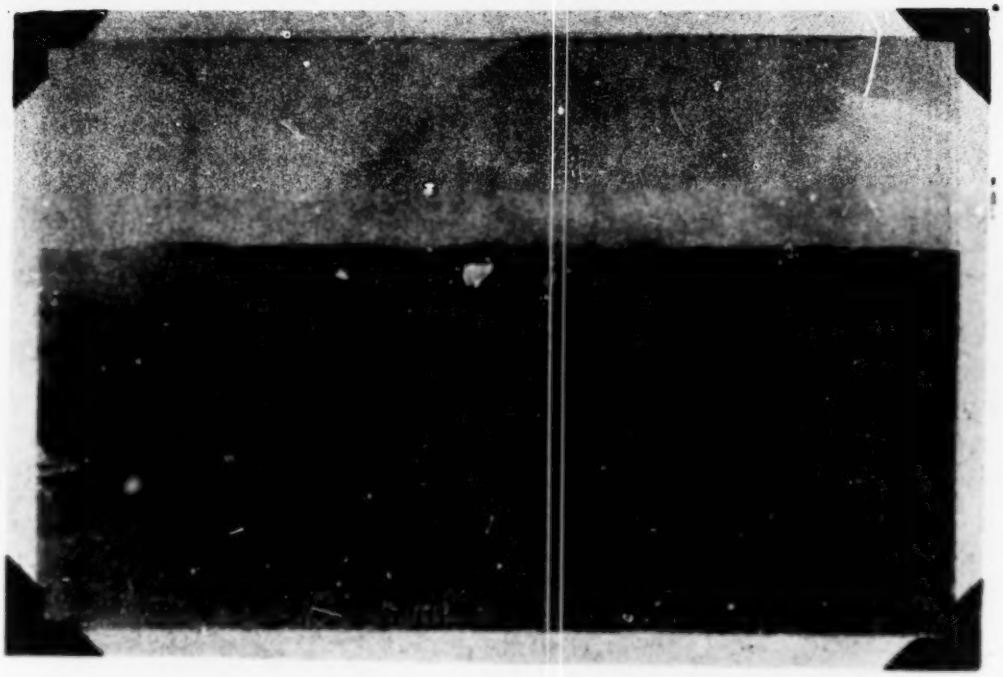
geologic map (Pl. 1). From this confluence the river continues as a braided shifting stream to Milton. North of Milton the river divides into several distributaries as it traverses the fertile Milton-Freewater fan, chief among these being the Little Walla Walla River. The Little Walla Walla River in turn divides by a complex of interlacing branches—the so-called Ford and Crockett branches—into the West Little Walla Walla River and the East Little Walla Walla River, which rejoin the main stream north of the Oregon-Washington boundary. The flow in these natural distributaries is regulated for irrigation during the spring and summer, and the number of natural channels is augmented by canals for diversion Thus, dur-

ing the irrigation season, most of the flow of the river is commonly diverted into the channel of the Little Walla Walla River, and continues to "The Frog" at the north edge of Freewater, where the water is distributed to the Ford and Crockett branches and to the Hudson Bay and Pleasantview canals. Possibly owing in part to this interruption of the natural regimen, the main (Tumalum) channel of the Walla Walla River is commonly dry during the summer between the railroad bridge north of Freewater and the McCoy bridge about 2 miles downstream, although several of the branches of the Little Walla Walla River continue to flow entirely across the alluvial fan. Beyond [fol. 129] the alluvial fan, however, the main Walla Walla River is perennial, its flow being replenished in part by springs (pp. 86-95). From the McCoy bridge, it courses northward about 2 miles into the State of Washington, thence northwestward about 7 miles to Whitman station, and westward to its confluence with the Columbia River at Wallula, 28 miles west of Walla Walla. Commonly it is braided, sinuous, and shifting as far downstream as Touchet and 2 miles beyond (Pl. 2, B). In its reach between

Plate 2.—B. View up the Walla Walla River from the bridge 4½ miles downstream from the Oregon-Washington boundary.

the Oregon-Washington boundary and Whitman station, the river is joined from the south by its several distributaries, which are augmented by springs as is the major stream.

(Here follows 1 photo, folio 128)



A. Confluence of the North Fork and the South Fork of the Walla Walla River, 6 miles southeast of Milton, Oregon.

B. View up the Walla Walla River from the bridge 4½ miles downstream from the Oregon-Washington boundary.

U S GEOLOGICAL SURVEY

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| Advance Data-Subject to Revision<br>ARTHUR M. PIPER Geologist<br>Released OCT 30 1933 AMP | Original data by<br>Compiled by<br>. . |

The gradient of the Walla Walla River decreases progressively downstream. At the junction of the canyons of the North and South Forks, it is about 80 feet in a mile, but across the fan north of Milton the average slope is 60 feet in a mile. At Whitman, in the central part of the valley, the slope is 40 feet in a mile and farther downstream, between Touchet and the head of the gorge at Reese, it becomes less than 10 feet to the mile.

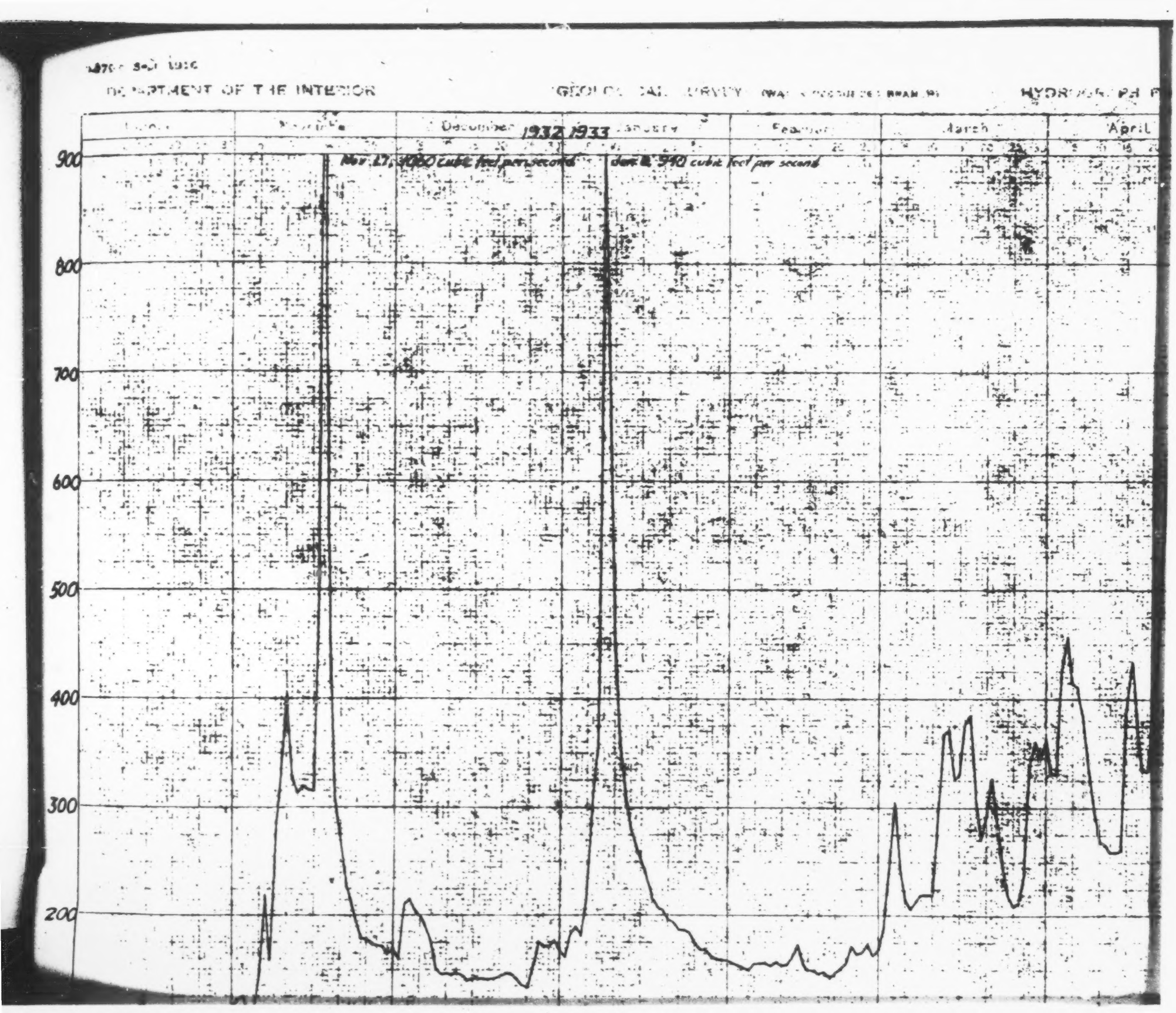
[fol. 130] The Walla Walla River drains about 150 square miles above Milton, its drainage area being moderately rugged and moderately high in altitude. Little rain falls on the drainage area in the summer and a large part of the precipitation in the winter is snow. Under these conditions the stream is subject to an annual spring freshet and is flashy throughout the year. These characteristics are illustrated by an accompanying hydrograph (fig. 3) of the com-

Figure 3.—Combined daily discharge of the North and South Forks of the Walla Walla River, near Milton, Oregon, 1932-33.

bined flow in the two forks of the river in 1932-33 measured in sec. 22, T. 5 N., R. 35 E., less than a mile above their junction. Thus, although the daily discharge was commonly less than 150 cubic feet a second and exceeded 300 cubic feet a second on only 18 days of the 5-month period ending February 28, 1933, it twice rose to about 1,000 cubic feet a second but maintained that discharge less than 24 hours.

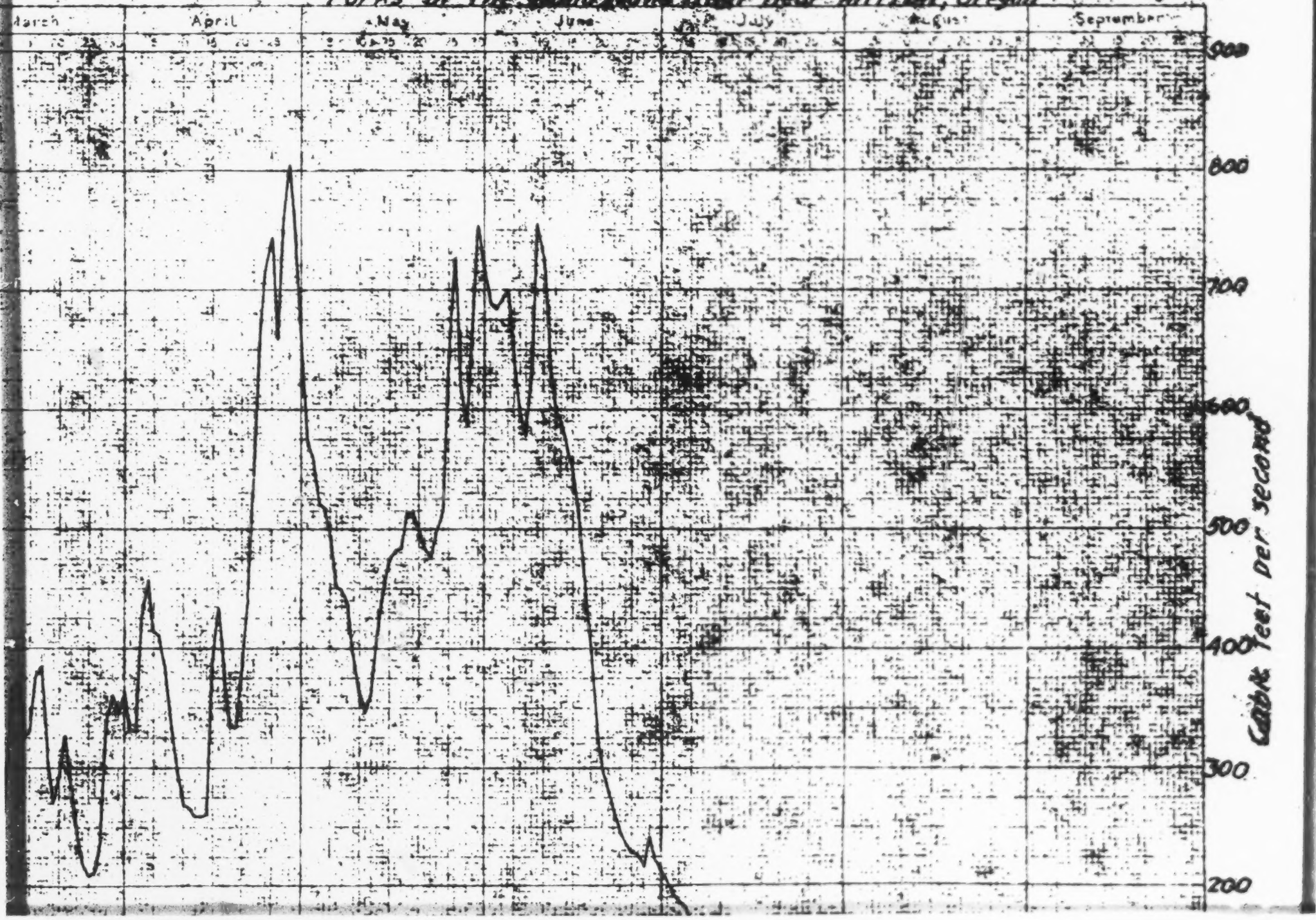
Mill Creek likewise rises in the Blue Mountains east of the area represented by Plate 1. It emerges from its canyon in the northeastern part of the area and, as it traverses its alluvial fan, divides into several distributaries. These include the upper reach of Yellowhawk Creek, also Stone and Garrison Creeks. Below the point at which these distributaries branch off, Mill Creek is intermittent for a distance of about 5 miles. The gradient of Mill Creek is about 100 feet to the mile at the mouth of its canyon near Tracy, 65 feet to the mile at Walla Walla, and 50 feet in a mile near Whitman, just above its junction with the Walla Walla River.

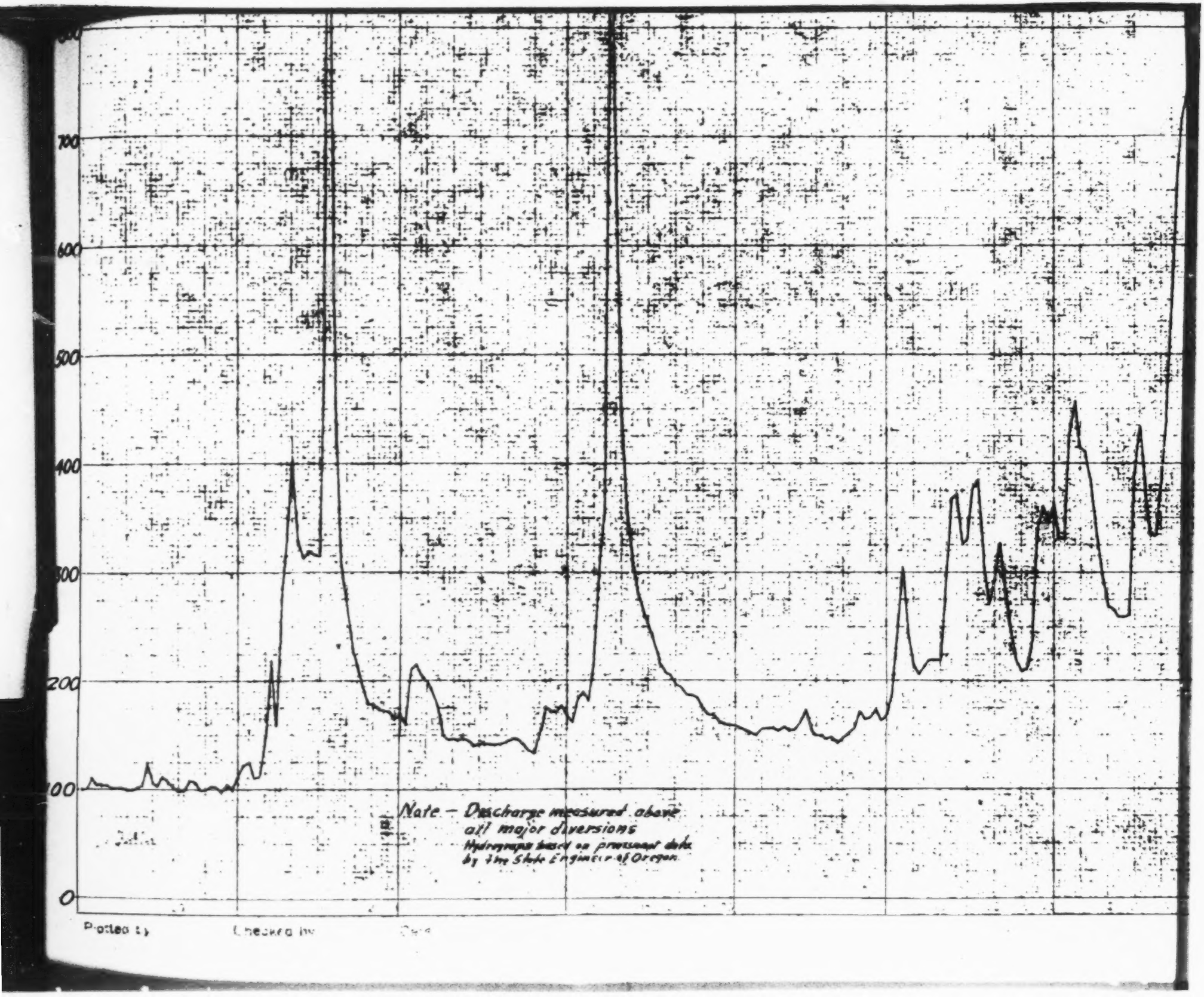
(Here follows 1 photo, folio 131)

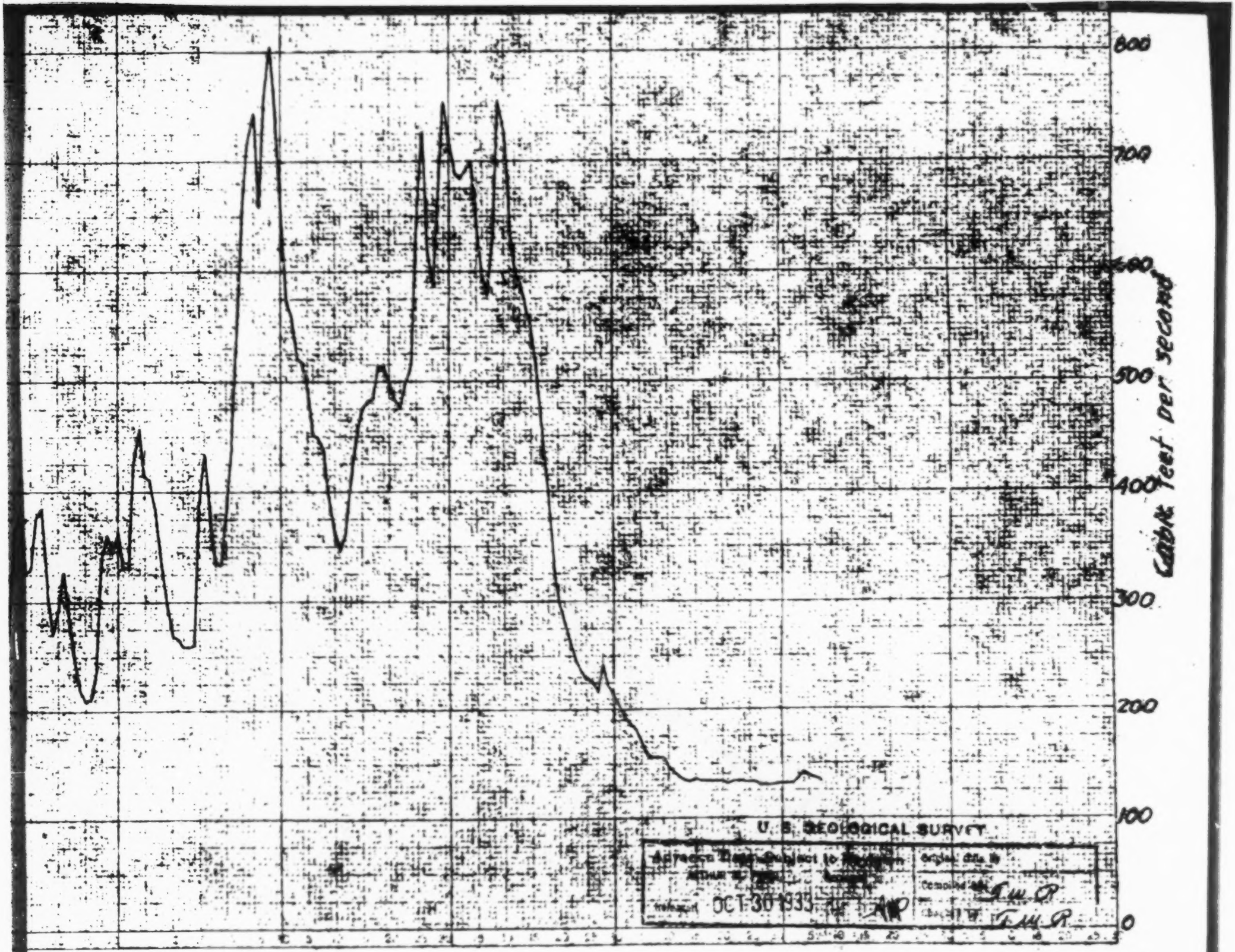

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
HYDROGRAPH
December
1932 1933
January
February
March
April
Nov 27, 1060 cubic feet per second
Dec 8, 940 cubic feet per second
900
800
700
600
500
400
300
200

Combined daily discharge of North and South Forks of the Walla Walla River near Milton, Oregon

Figure 3




700
600
500
400
300
200
100
0
Note – Discharge measured above all major diversions
Hydrographs based on previous data by the State Engineer of Oregon
Plotted by
Checked by
Date


800
700
600
500
400
300
200
100
0
Cubic Feet Per Second
U. S. GEOLOGICAL SURVEY
OCT 30 1933

[fol. 132] Below the mouth of Mill Creek, two minor tributaries join the Walla Walla River from the south and one from the north. The northern tributary, Dry Creek, rises in the Blue Mountains east of Walla Walla, and swings north of that city in an open curve concave toward the south; it enters the area represented by Plate 1 at its northern edge and in its lower reach follows the northern edge of the Gardena terrace. The tributaries from the south, which enter the main stream west of Lowden, are Mud Creek and Pine Creek. These streams drain the southwestern part of the valley in Oregon and Washington and also receive material contributions from springs on the Milton-Freewater fan. A major branch of Pine Creek, which is wholly in Oregon, is named Dry Creek. Like the stream in Washington which has the same name, it is roughly parallel to the margin of the Gardena terrace.

The largest tributary of the Walla Walla River, the Touchet River, lies almost entirely outside the area discussed in this report. It also heads in the Blue Mountains, flows in a rudely semi-circular course which passes 16 miles north of Walla Walla and ultimately joins the Walla Walla River in the western part of the area at the town of Touchet. Only the lower 3 miles of its course are within the area represented by Plate 1.

[fol. 133] Stratigraphy and Ground Water Conditions

## General Character and Succession of the Rocks

The rocks of the Walla Walla Basin include basalt that is probably the Yakima basalt, of Miocene age, and a succession of unconsolidated sediments and stream deposits of late Tertiary and Quaternary age. The basalt is the bedrock which underlies the entire basin and its environs and which forms the Blue Mountains and the upland along its southern edge. Along the margins of the basin this rock is overlain by "loess", stratified sand, and other incoherent deposits which mantle all but the steepest slopes. These incoherent deposits along the margins of the basin are not differentiated from the basalt on the geologic map (Pl. 1). The younger unconsolidated rocks are subdivided into three units which correspond to the principal land forms of the valley, namely: the high terrace deposits which form the Gardena terrace; the alluvial deposits which form

the low terrace 5 to 20 feet above the flood plains; and the young alluvium which composes the fans and the flood plains along the Walla Walla River and its tributaries. Together these deposits occupy the lowest part of the basin and are coextensive with the Walla Walla valley as that term is used in this report.

[fol. 134] Yakima (?) Basalt

Distribution, Petrography, and Structure

The basalt of the Walla Walla Basin is best exposed along the Walla Walla River west of the area represented by Plate 1, that is, from the narrows at Reese to the mouth of the river at Wallula, and in the bold cliffs farther west along the Columbia River. It is also conspicuous in the stream canyons which scar the flank of the Blue Mountains along the eastern and southern edges of the area. Elsewhere within the area considered in this report there are few exposures of the basalt, for in the uplands bordering the valley it is concealed by a thick mantle of the older incoherent sediments and in the central part of the valley is buried under unconsolidated deposits as much as 600 feet thick. A thickness of at least 1,200 feet of the basalt is exposed in the bluffs along the Columbia 2 miles southwest of Wallula. Also, well 6631K1[2] (p. 271) penetrated 1,800 feet into the basalt, and well 7429G1 (p. 273) penetrated 1,080 feet into it but neither well reached the bottom of the formation. Thus, its total thickness in the area is not known.

[fol. 135] Commonly the basalt is fine-grained, dense, and dark gray to black on fresh surfaces; in most outcrops it is divided by columnar joints and is weathered to a brown, friable residuum. Although commonly dense, the basalt contains porous vesicular layers which are encountered both in exposures and in wells. Sediments are reported to be interbedded with the basalt in two deep wells drilled near Milton. Thus, well 551B2 (p. 257) penetrated 100 feet of basalt, 41 feet of blue clay, 100 feet of basalt, and finally 17 feet of blue clay. In well 6631K1, 1½ miles northeast of

[2] The number of a well indicates its location as is explained on page 108.

well 551B2, a 17-foot bed of shale and a thin lentil of fine white gravel were encountered 217 feet and 1,190 feet, respectively, below the top of the basalt.

The Walla Walla Basin has disclosed no evidence as to the age of the basalt. No fossils have been found in the interbedded or overlying incoherent sediments, and nothing is known concerning the underlying rocks. Tentatively the basalt is assumed to correspond to the Yakima basalt of Miocene age, which is widespread in central Oregon and in south central Washington.[3]

[fol. 136] The structure of the basalt in and beneath the Walla Walla Basin is not disclosed in detail by the few outcrops of the rock but its general features are revealed by the major land forms, which seem to conform approximately to the regional structure. The major feature of the region is the down-warped Walla Walla basin, which is bounded on the southeast by the Blue Mountains uplift, on the south by an eastward extension of the Horse Heaven Hills uplift, and on the north by a block which rises very gently toward the north. The floor of this basin is defined by the reported records of 25 deep wells. These data suggest that in the deepest part of the basin, which extends from Touchet to a point on the Oregon-Washington boundary between Whitman and Umapine, the top of the basalt is below sea-level. It is also about 400 feet below the floor of the gorge which is the present drainage outlet. From the bottom of this trough the basalt rises southward to the crest of the Horse Heaven Hills anticline; the dip is 3°-4° N. 20° E. and presumably is uniform. North of the basin the summits of the highest ridges decline southward approximately 40 to 50 feet in a mile toward the axis of the downwarp. These ridges are presumed to reflect an equal slope of the basalt bedrock. In the eastern part of the Walla Walla basin the basalt rises into the Blue Mountains block, the dip being 3°-6° N. 65° W.

[fol. 137] The diastrophic history of the Walla Walla Basin is not known, but in other parts of the Columbia

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[3] Smith, G. O., U. S. Geol. Survey Geol. Atlas, Ellensburg folio (No. 86), 1903; Mount Stuart folio (No. 106), 1904. Piper, A. M., Geology and ground water resources of the Dalles region, Oregon: U. S. Geol. Survey Water-Supply Paper 659, p. 120, 1932.

Plateaus deformation of the volcanic rocks began in middle or late Miocene time and has recurred in several epochs into very late geologic time.[4] The history of the Walla Walla Basin may be equally complex. A faint suggestion that the basin may have been further deepened in very late geologic time lies in the tendency of Walla Walla River and of Mill Creek to crowd the north margins of their fans. On the other hand, this same tendency might have resulted from mutual adjustment of the two streams to a common base level. None of the terraces within the basin slope so steeply as to suggest that they have been tilted.

[fol. 138] Artesian Conditions in the Yakima (?) Basalt

The Yakima (?) basalt yields water for domestic uses outside the Walla Walla valley and supplies some of the water for irrigation within the valley. In general, water in the basalt is recovered either from discontinuous vesicular zones ("honeycomb rock" or "porous rock" of the well driller) or from fractures where the basalt is otherwise dense. Definite water-bearing strata or layers of wide extent appear not to be present in the basalt of this region.

The wells outside the Walla Walla valley are generally located in the small valleys and canyons and penetrate the rather shallow alluvium to obtain water from the underlying basalt. Several wells drilled in Dry Creek valley, including Nos. 754H1 and 7518A1, penetrate 45 to 185 feet of unconsolidated deposits, and obtain water of good quality in the upper 90 to 125 feet of basalt. On the other hand, according to A. L. Ebersol, a driller in Walla Walla, a well drilled 30 miles north of Walla Walla penetrated 1,493 feet of basalt before striking a water-bearing zone; the water is reported to have stood about 1,170 feet below the surface in this well when it was drilled.

[fol. 139] Within the Walla Walla valley, a number of deep wells penetrate the unconsolidated deposits and tap bodies of water confined in the underlying basalt; at least 35 of these are or have been flowing wells, all of which are within 3½ miles of College Place, Washington. Several wells yield sufficient water for economic irrigation. Among these, Nos. 551B2, 6525B1, 6533M1, and 6534P2 in Oregon; and 651B1, 651B2, 6510P1, and 6512P1 in Washington, are

[4] Piper, A. M., op. cit., pp. 139-140.

typical of those wells which have been drilled on the flood plains. Wells 6631K1 in Oregon and 651J1 in Washington are typical of those which have been drilled on the Gardena terrace. In most of these deep wells the water is recovered from porous vesicular zones—reported to be three in number—in the upper 100 feet of basalt. A. A. Durand, of Walla Walla, who drilled many of th wells, states that the deeper porous zones have progressively greater artesian pressure. In several of the wells, among which No. 7525N1 is typical, the water is confined beneath dense basalt which overlies the water-bearing "honeycombed rock"; in other wells, such as Nos. 651B1 and 651B2, gray clay at the base of the unconsolidated deposits immediately overlies porous water-bearing basalt and apparently constitutes the confining bed. Other wells in the basalt—including Nos. 644E1 and 7429G1—have such small capacity that they can not be pumped for irrigation economically.

[fol. 140] Of the 35 flowing wells known to be within 3½ miles of College Place, only one well, No. 6513P1, is south of the Oregon-Washington boundary. Other flowing wells would doubtless be revealed by a complete canvass of the area and several additional wells have been abandoned because they did not flow. As more wells have tapped the water confined in the basalt, the artesian pressure has gradually diminished, so that wells which once flowed perennially have ceased to flow in summer, pumps have been installed for irrigation, and many of the wells are pumped throughout the year. In 1933, only ten of the wells continue to flow throughout the year; they are used to irrigate tracts of 5 to 55 acres. Several others now flow during the winter but not in the irrigation season. According to Mr. Durand, the well on the Hansen property, No. 651J1, behaves altogether differently from the majority of the deep wells. Located on a remnant of the Gardena terrace, it has a large flow the year around, whereas wells on the lower flood plain to the north, east, and west flow weakly or cease flowing entirely in summer. Fractures approximately 100 feet below the top of the basalt constitute the source of the water in this well and no "honeycomb" zones were encountered.

The well owned by Mr. Jaussaud, No. 6510P1, taps a porous vesicular layer which is 15 feet thick and which is 520 feet below the top of the basalt. The basalt overlying

this porous layer is dense throughout. According to Mr. Durand the well supplied 2,000 gallons a minute when first drilled.

## [fol. 141] Incoherent Deposits Older Than the Gardena Terrace

The incoherent deposits which mantle the basalt on practically all the slopes which rise above the Gardena terrace include four distinct types; these are "loess", unstratified pebbly silt, stratified sand and silt, and coarse cobbles and boulders. Though locally the distinctions between them are obvious, the four are too poorly exposed to have been discriminated systematically during the brief term allotted to the geologic mapping. Accordingly the relation of one to another is not known.

By far the greater part of the area which is mantled by undifferentiated rocks (Pl. 1) has a deep soil over which a dust mulch 3 to 6 inches thick is developed by summer fallowing. This is the so-called "loess". The best exposure of the material which underlies this "loess" soil is in the prominent 100-foot bluff which forms the south bank of Mill Creek 2 miles east of Walla Walla, in sec. 23, T. 7 N., R. 36 E., and which rises to altitude 1,250 feet. The upper 25 feet of this bluff exposes massive unstratified silt. Most of the lower part of the slope is smooth and grass-covered, but scattered exposures of silt occur there as well. All the exposed silt is homogeneous, buff-colored, and contains numerous calcite veinlets and minute cavities and tubes suggestive of borings and root casts. Similar homogeneous and unstratified silt is exposed in many shallow road cuts throughout the area of undifferentiated rocks. The absence of stratification and of coarse particles in much of the silt suggests that it may have been accumulated by wind, and is therefore loess. The absence of quartz and the presence of basalt and its decomposition products suggest that the silt was derived from basalt.

[fol. 142] Pebbly silt, buff, massive, and unstratified, is well exposed in a roadcut in the SW ¼ sec. 28, T. 8 N., R. 36 E., at altitude 1,050 feet. In the matrix of this silt are embedded both angular and rounded fragments, pebbles, and cobbles of basalt with no obvious sorting; here and there occur pebbles of granitic and other crystalline rocks foreign to the drainage basin of the Walla Walla River.

Many of the basalt particles are fresh, but some are much weathered. This pebbly silt, like the fine-textured loess, is common throughout the area of undifferentiated rocks. Bretz[5] considers the pebbly silt to be "reworked loess", and implies it to be a product of the "Spokane flood" in the Columbia River and to be broadcast throughout the region at altitudes less than 1,100 feet. Except for the hills south of Mill Creek which have been described in the preceding paragraph, nearly the entire area considered in this report is below the 1,100-foot contour. However, the few clear exposures of these sediments in the small Walla Walla basin neither affirm nor refute the hypothesis formulated by Bretz.

[fol. 143] The stratified sand and silt is known to occur in only one part of the area, its northwestern corner, where it overlies the basalt above the Gardena terrace. Along the new highway in secs. 29 and 30, T. 7 N., R. 33 E., there are several excellent exposures of this material, and the underlying basalt crops out in several places along the floor of a gully less than 100 yards to the north and up to altitude 550 feet. This incoherent deposit comprises well-stratified sand and silt in beds 6 to 18 inches thick. Each bed is composed at its base of coarse gray sand commonly cross-bedded, and grades upward to very fine buff sand and silt at the top; the contact between beds is everywhere sharp. Generally the beds are horizontal, but in some places are contorted or faulted on a minute scale; this deformation would seem to be due to local failure of the weak sediments during their compaction and subsequent dissection. Contemporaneous dikes of sand and silt 1 to 24 inches thick transect the bedding and are commonly much contorted and faulted. Locally the stratified sand and silt inclose small lenticular or irregular pockets of gravel and small cobbles; most of these particles are of basalt but a few are of granitic and metamorphic rocks. Lithologically these sediments are almost identical with the well-stratified sediments which form the Gardena terrace (pp. 40-45). However, the highest of these sands form a flattish area at

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[5] Bretz, J. H., Valley deposits east of the channeled scabland: Jour. Geol., vol. 37, pp. 513-516, 1929.

altitude 650 feet—fully 200 feet above the remnants of the Gardena terrace 2 miles to the south and separated from those remnants by a distinct geomorphic boundary. Locally a mesa of basalt 100 to 200 feet high borders this flat surface to the north, and a small knob of basalt separates it from the present channel of the Walla Walla River. Thus there lies in the present topography a suggestion that these [fol. 144] stratified sediments—and possibly the coarse cobbles near the eastern end of the gorge west of Touchet—fill a former stream channel between the Walla Walla Basin and the Columbia River. However, if such a channel has existed it would seem to have been grossly tilted and deformed. Obviously, a search in the field for evidence pertinent to this problem lay beyond the scope of this investigation.

Similar stratified sand is also exposed about 3 miles farther east along the road 3 miles north of Touchet and about 50 feet above the projected level of the Gardena terrace. There the underlying basalt does not crop out. Still farther east, small outcrops of stratified coarse and fine sand occur in sec. 24, T. 7 N., R. 33 E., at altitude 550 feet. Deposits of stratified sand which stand definitely above the Gardena terrace were not found east of this outcrop.

Both the pebbly silt and the stratified sand and silt contain fragments and particles of rocks foreign to the drainage basin of the Walla Walla River; according to Bretz[6] erratic material of this sort is common in nearly all outcrops less than 1,100 feet above sea-level. The erratic material may well have been deposited initially within the Walla Walla valley in an epoch which antedated the Gardena terrace, the Columbia River presumably having transported the material during one of the glacial stages. Subsequent erosion and sedimentation in the Walla Walla Basin have left only meager and inconclusive suggestions of this postulated early deposition. If the highest erratics and uppermost beds of pebbly silt define their initial limits on the present topography, these early sediments may once have been distributed over most of the area described in this report.

[fol. 145] The coarse gravel and cobbles to which reference was made on page 37 overlie the basalt at the eastern

[6] Bretz, J. H., op. cit.

or upstream end of the gorge of the Walla Walla River, 2½ miles west of Touchet. There in a tributary gully near the center of sec. 6, T. 6 N., R. 33 E., at least 25 feet of this coarse cobble deposit is exposed; it consists of poorly sorted, poorly stratified gravel, cobbles, and boulders as large as 10 inches in greatest dimension. So far as known all the cobbles and boulders are of basalt; some are rounded but many are sub-angular. Lentils of cross-bedded sand and silt are inclosed in the gravel locally and the whole is commonly compact and somewhat lithified by calcareous cement. Half a mile to the east, at the same altitude, a similar cobble deposit is exposed in a railroad cut. The uppermost cobbles in these exposures are very little above the level of the Gardena terrace south of the river, but the top of the hill along whose slope they crop out is nearly 50 feet above the projected position of the terrace. Accordingly, these coarse deposits are included tentatively among the sediments older than the Gardena terrace.

The unconsolidated sediments older than the Gardena terrace—the massive loess, the pebbly silt, and the stratified silt and sand which collectively mantle the basalt—are generally fine-textured and presumably are not highly permeable. They are not known to yield water to any wells.

[fol. 146] Erratic Boulders of Uncertain Age

Boulders which have been transported to the Walla Walla valley from distant points were found at 44 localities in the course of the geologic mapping, but a complete canvass of the area was not made. Most of these erratics are associated with the deposits of the Gardena terrace (pp. 40-49); others accompany the deposits older than that terrace, and a few accompany the alluvium of the flood plains. All are petrographically unlike any of the rocks known to occur in place within the drainage basin of the Walla Walla River and its tributaries. A full discussion of these erratic boulders is beyond the scope of this report, but those which have been observed are listed in an appended table (pp. 100-106) because they seem to have a critical place in the ultimate unravelling of the regional geologic history. Some (locality 37, p. 105) are embedded in a compact till-like matrix which suggests rafting on floating ice as the presumptive method of transportation; certain others (localities 1 and 4) are so large that floating ice seems to be the

only feasible vehicle of transportation. The localities range in altitude from 400 feet above sea level along the river west of Touchet (locality 10), to 1,025 feet above sea level on the Gardena terrace southwest of Russell (locality 35). The largest erratics are located in the western part of the valley, and the others seem to grade to the smaller sizes toward the east. This suggests that the erratics were brought in to the area from the west, that is, from the direction of the Columbia River. The age of these boulders, with respect to the conventional time scale of the Pleistocene or to the local sequence of epochs of erosion and sedimentation, is not known. They may well have been transported into the valley in more than one epoch.

[fol. 147] High Terrace Deposits (Gardena Terrace)

Lithology and Distribution

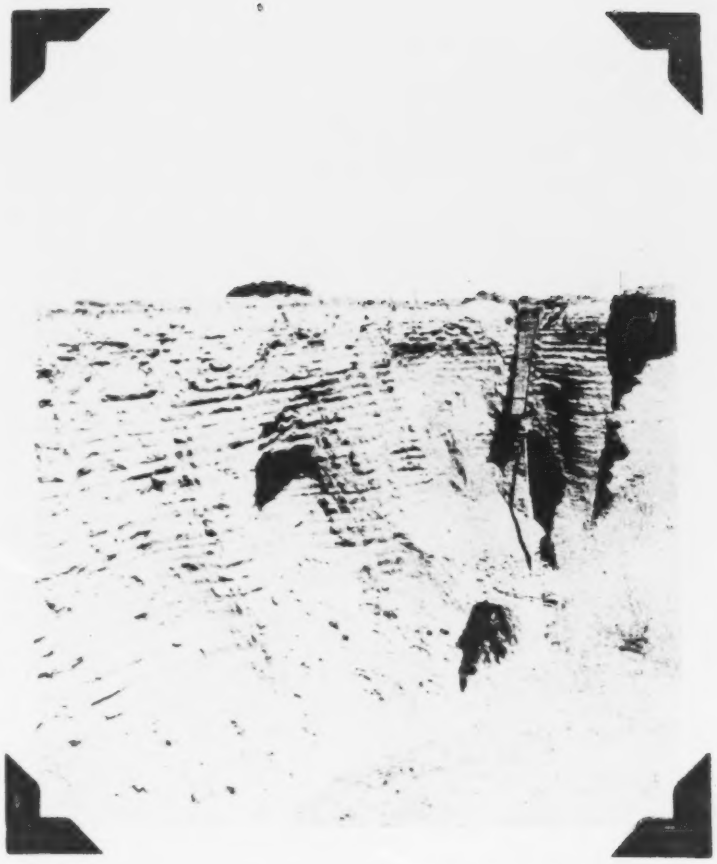
The deposits of the Gardena terrace include the sediments which compose the visible parts of the terrace, that is, above the present flood plains, as well as the concealed sediments which underlie the terrace remnants and rest on the basalt bedrock. The sediments which stand above the flood plains are mostly stratified sand and silt, which are underlain by gravel in a few exposures. Those which are concealed are known only from the records of deep wells.

The stratified sand and silt, which predominate in the exposures of the Gardena terrace in the western part of the area, are well exposed 2 miles south of Lowden in the wasteway from the Burlingame ditch. There, 28 beds are exposed, each containing cross-bedded coarse gray sand at the base, grading upward to massive buff silt at the top, and terminating sharply against the overlying bed. These features are depleted by Plate 3, A, and by two partial

Plate 3.—A. Stratified sediments of the Gardena terrace exposed in the wasteway from the Burlingame ditch, in sec. 5, T. 6 N., R. 34 E.

sections which follow.

(Here follows 1 photo, folio 148)



A, Stratified sediments of the Gardena terrace exposed in the wasteway from the Burlingame ditch, in sec. 5, T. 6 N., R. 34 E.

B, Stratified sand and silt and compound sand dike in the deposits of the Gardena terrace.

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[fol. 149] Partial Section of the High Terrace Deposits in the Wasteway of the Burlingame Ditch in the S. W. ¼ S. W. ¼ sec. 5, T. 6 N., R. 34 E.

Top of section is at the level of Gardena terrace, approximate altitude 580 feet.

| | Feet |
|---|---|
| 1. Silt, gray | 6 |
| 2. Sand, well stratified: 28 distinct beds, each composed of coarse gray cross-bedded sand at the base, and grading upward to buff silt. The coarse sand ranges from 2 to 40 per cent of the thickness of the bed. The beds are 6 inches to 4 feet thick, the thinner beds in the upper part of the section. Dikes of sand and silt, 2 to 12 inches thick, transect these beds at angles of 60° to 90° and in one place, a boulder, apparently of basalt, was seen, embedded at the base of a bed | 75 |
| 3. Silt, somewhat pebbly, which may be the upper part of another bed similar to but thicker than those in member 2 | 6 |
| Floor of wasteway and base of measured section is debris-covered. | |
| Thickness of measured section | 87 |

[fol. 150] Partial Section of the High Terrace Deposits Along the South Bank of Pine Creek, 4 Miles Southeast of the Burlingame Wasteway, in the N. W. ¼ S. W. ¼ sec. 22, T. 6 N., R. 34 E.

Top of section is probably a remnant of the Gardena terrace, approximate altitude 600 feet.

| | Feet |
|---|---|
| 1. Very fine sand and silt, unbedded, light buff | 10 |
| 2. Sand, 15 beds 1 to 2½ feet thick, each with gray coarse sand at base, yellow silt to fine sand at top | 28 |
| 3. Coarse sand, unstratified; lentils of pebbles less than 1 inch in diameter, blocks of silt and sandstone up to 6 inches in length | 1 |

Partial Section of the High Terrace Deposits Along the South Bank of Pine Creek, 4 Miles Southeast of the Burlingame Wasteway, in the N. W. ¼ S. W. ¼ sec. 22, T. 6 N., R. 34 E.—Continued.

| | Feet |
|---|---|
| 4. Very fine sand, massive; current bedding in coarser sand near base | 4 |
| 5. Coarse sand, cross-bedded, gray; basalt grains less than 3 millimeters in diameter | 1 |
| 6. Silt, plastic when wet, well-sorted; discontinuous because of erosion preceding the deposition of member 5 | 0 to 1 |
| Base of section is channel of Pine Creek. | |
| Thickness of measured section | 45 |

[fol. 151] In their gradation from coarse particles at the base to fine particles at the top the beds exposed in these two sections are analogous to varves, but the size of the grains and the relatively great thickness of the beds are entirely unlike the thinly-laminated fine sediments which compose true varves. Moreover, the cross-bedding indicates that these sediments were certainly not deposited in quiet water, but from water moving with moderate velocity. Hence it is not obvious that the strata are annual laminations, as true varves are generally presumed to be, although the alternation of coarse and fine sand certainly indicates cyclic fluctuations in the texture of the load transported by the streams from which the sediments were deposited. In these and other exposures, the beds range from 2 inches to 4 feet thick. These stratified sediments are conspicuous in cuts along the highway west of Lowden, where wind has etched the surface by removing the particles of coarse sand. East of Lowden the stratification is commonly inconspicuous, but is brought out in numerous exposures when the finer materials are saturated with water from the spring rains; under these conditions road cuts near the Whitman Monument in sec. 32, T. 7 N., R. 35 E., and south of College Place, in secs. 1 and 2, T. 6 N., R. 35 E., show pronounced stratification.

[fol. 152] Conspicuous in many outcrops of the stratified terrace deposits there are minor faults, folds, contorted beds, and dikes of sand and silt, presumably the products

of settling and compaction after the sediments were laid down. The initial stages in the development of these phenomena are well shown in the wasteway below the Burlingame ditch. Differential settling of a 2-foot bed of sand into the underlying silt caused several minute block faults across the sand bed, and the silt, evidently plastic, was forced up along several of these fractures to a maximum height of 18 inches. Other dikes of clayey silt in these deposits become narrower and finally pinch out upward. There are still other dikes which are made of coarse sand and which pinch out downward; these apparently were formed by filling fissures from the top. Compound dikes, made up of a dozen or more vertical stringers of silt and sand, are common (Pl. 3, B); they are presumed to have

Plate 3.—B. Stratified sand and silt and compound sand dike in the deposits of the Gardena terrace.

developed by the repeated opening and filling of a fracture during the compaction of the sediments. In places the sand which composes these dikes has a faint, nearly horizontal stratification; elsewhere it is stratified subparallel to the inclosing walls. Horizontal faults offset many of these dikes along bedding planes, the displacement being usually less than 3 feet. Other features resulting from compaction are the minute folds and contortions in the larger dikes and in the beds themselves, and the small normal faults which offset the beds.

[fol. 153] Unstratified buff pebbly silt is of wide extent and considerable thickness in the terrace deposits. Usually 50 to 75 per cent of the grains in this facies are silt, and less than 25 per cent are coarser than 1 millimeter in diameter. Commonly the coarse fraction includes pebbles, cobbles, and even boulders, which are intimately distributed throughout the silt, and most of which are basalt—some fresh, some much weathered. However, the coarse fraction also includes many grains of quartz and some fragments of rock entirely foreign to the Walla Walla drainage basin.

Grains, fragments, and boulders of basalt and of foreign rock also occur embedded in the stratified sand. Thus, on the floor of the wasteway from the Burlingame ditch (p. 102, locality 16) there are many cobbles and boulders, both angular and rounded. Most of these are of basalt, but

there are several of granodiorite, one of gneissoid granite, and one granite block 3½ feet in maximum dimension; all these presumably are residual from the stratified sand and silt which was removed in forming the wasteway. In the wall of the wasteway, a 10-inch boulder of basalt was found embedded in the coarse sand of one bed. In other localities the stratified sand incloses small lentils and pockets of unassorted sand and gravel.

[fol. 154] The stratified sand and silt form the uppermost layers of the Gardena terrace throughout the area represented by the geologic map (Pl. 1), but in general, they are thickest in the western part of the valley. Thus, at least 80 feet of silt and fine sand are exposed in outcrops south of Touchet, and a total thickness of 150 feet is reported in a well at Gardena, No. 639D1. In the central part of the valley, between Umapine and College Place, the terrace remnants stand 40 to 50 feet above the flood plains and the fine sand and silt of which they are composed extend considerably below those plains. For example, well 6512P1, located at the edge of one of the terrace remnants, penetrates only silt and fine sand though it reaches 25 feet below the flood plain. Still farther east, the well at the Walla Walla airport, No. 7615B1, penetrated only 20 feet of sand and silt beneath the terrace and then entered coarse gravel and cobbles. Near the southeastern apex of the valley, the well of the Milton Nursery Co., No. 6631K1, also passed through 20 feet of fine material and then entered gravel. Near the apices of the young alluvial fans of the Walla Walla River and of Mill Creek, the cut banks expose 3 to 18 feet of fine material resting on compact ill-sorted gravel and coarse cobbles.

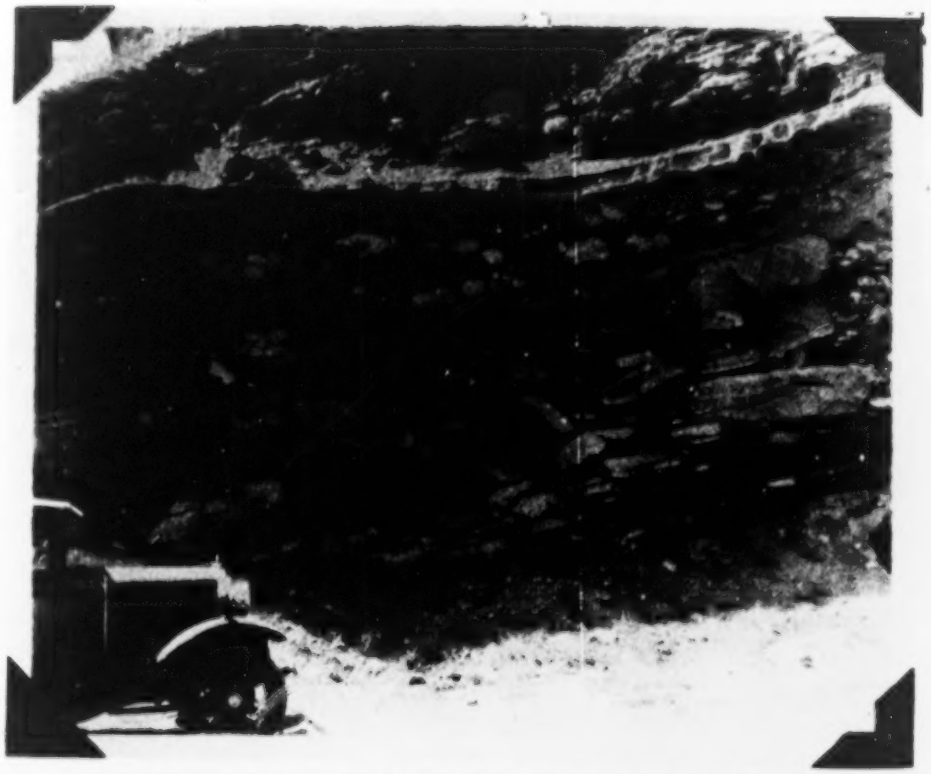
[fol. 155] Coarse gravel and cobbles crop out beneath the stratified sand and silt in three localities: (1) in the bluff east of the Walla Walla River at Milton and Freewater and elsewhere about the apex of the Milton-Freewater fan, (2) along the north side of Mill Creek about the apex of its fan, and (3) in a gravel pit south of the Walla Walla River a mile south of Touchet. These coarse deposits near Milton comprise ill-sorted poorly-rounded pebbles and cobbles of basalt, generally less than 8 inches in diameter, assembled in rude beds of compact gravel. Commonly the gravel is lithified with calcareous cement in its uppermost part and is weathered and iron-stained throughout the ex-

posures. Beds of such material inclose lentils of sand and silt, poorly stratified or unstratified and not assorted. The full thickness of the coarse sediments in this vicinity is revealed in the well of the Milton Nursery Co., No. 6631K1 (p. 271); there fine sediments 20 feet thick are underlain by gravel 180 feet thick which rests upon the basalt bedrock. The lower part of the section exposed in the gravel pit south of Touchet includes much coarse cross-bedded basaltic sand, gravel, cobbles, and even boulders (Pl. 4, A).

Plate 4.—A. Deposits of the Gardena terrace exposed in the gravel pit a mile south of Touchet, Washington.

There are also blocks of buff slightly-consolidated silt and very fine sand as much as 6 feet long embedded in the sand and gravel—silt so little consolidated that the blocks could not have been transported far or handled violently without becoming disintegrated. The pronounced current bedding and the large size of the boulders indicate vigorous currents. There are several beds of fine sand and silt in the upper part of the section. A partial section in this locality follows. Similar coarse deposits may be seen along the south bank of Pine Creek in sec. 7, T. 6 N., R. 34 E.

(Here follows 1 photo, folio 156)



A, Deposits of the Cardiam terrace exposed in the gravel pit a mile south of Tenchet, Washington.

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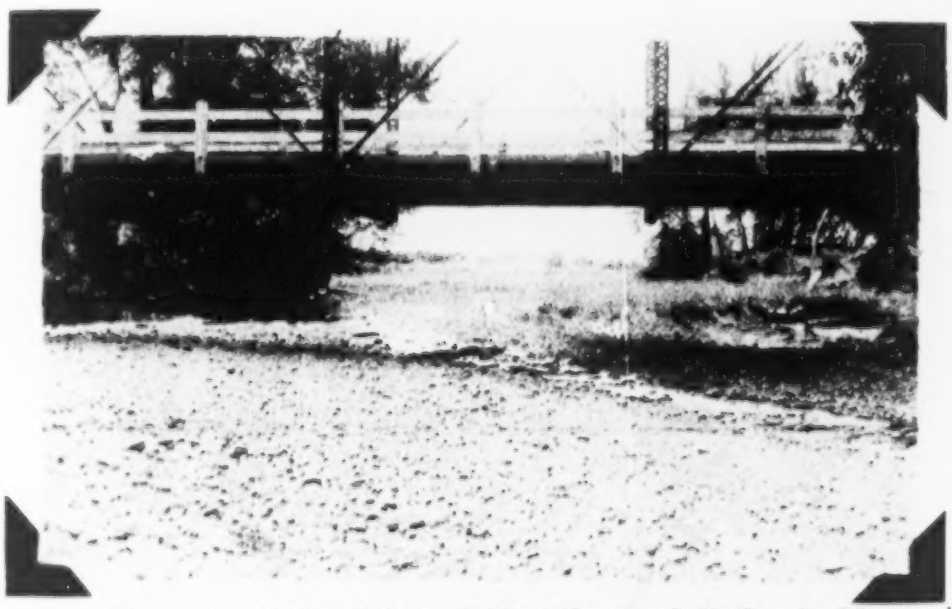

B, Channel of the Walla Walla River at McCoy bridge, in secs. 24 and 25, T. 6 N., R. 35 E., on July 29, 1933.

[fol. 157] Partial section of the high terrace deposits in gravel pit a mile south of Touchet in the NW. ¼ SE. ¼ sec 3, T. 6 N., R. 33 E

| | Feet |
|---|---|
| Top of exposed section is about 50 feet below the Gardena terrace; approximate altitude 500 feet. | |
| 1. Sand, well stratified; several beds 6 inches to 2 feet thick, each of coarse cross-bedded sand at the base, grading upward into buff fine sand and silt | 15 |
| 2. Coarse sand, black, top and bottom horizontal | 1 |
| 3. Sand, fine to medium, buff; grades into member 4; apparent dip 5° E. | 1 to 4 |
| 4. Coarse sand and gravel, black; apparent dip 5° E. | 10 |
| 5. Coarse sand, gravel, cobbles, and boulders to 3 feet in diameter, subangular to rounded; some boulders of yellow silt, nearly all others of basalt; well stratified but cross-bedded in parts; apparent dip 5° E. | 8 to 5 |
| 6. Silt, buff; base and top are uneven erosional contacts | 1½ to 0 |
| 7. Coarse sand, gravel, cobbles, boulders, similar to member 5 | 3 to 8 |
| 8. Sand, coarse to fine, gray, cross-bedded, apparent dip 5°-15° E. | 2 to 1 |
| 9. Coarse sand and gravel, few cobbles and boulders, black, stratified; apparent dip of 10° E. Blocks of silt up to 6 by 2 feet, with long dimension parallel to bedding; top an erosional contact | 10 to 12 |
| 10. Silt and fine sand, buff | 3 to 0 |
| 11. Coarse sand and gravel, black, few cobbles; bedding horizontal, top is a very rough erosional contact | 3 to 7 |
| Base of section is road about 20 feet above the flood plain of the Walla Walla River. | |
| Thickness of measured section | 55 |

[fol. 158] In other parts of the Walla Walla valley, the character of the beds in the lower part of the deposits underlying the Gardena terrace is known only from the incomplete records of a few deep wells. These report gravel, sand, and "clay" to a depth of 500 feet below the land surface near College Place and to a depth of 700 feet in well 644E1 south of Lowden.

## Origin

The surface form of the Gardena terrace and its slope—70 to 15 feet in a mile toward the west (p. 18)—suggest forcefully that its topmost beds are alluvial and were deposited by the ancestral Walla Walla River and Mill Creek. Indeed several lithologic aspects favor the hypothesis that all the exposed beds of the high terrace deposits are subaerial and fluvial. Thus, unassorted gravel occurs near the mouths of the canyons at the eastern edge of the valley; the fine sediments increase in aggregate thickness and become more thoroughly assorted toward the west; and lentils and pockets of cross-bedded sand and gravel occur throughout the deposits. The repeated gradation from coarse to fine material in each stratum of these deposits indicates a cyclic fluctuation in the competence of the currents or in the size of particles available for transportation and sedimentation; a fluctuation of this sort is not necessarily incompatible with fluvial origin.

Other features favor the hypothesis that the sediments of the high terrace are largely subaqueous and possibly deltaic, though the ordinary regimen of the delta environment perhaps would not apply in the relatively small and land-locked Walla Walla Basin. It seems obvious that the sediments were not deposited in quiet water for crossbedding is universal in legible exposures and bespeaks currents of moderate velocity. The beds which are exposed in the wasteway from the Burlingame ditch are better stratified than is common in fluvial deposits; conceivably they are subaqueous topset beds. Possibly the coarse [fol. 159] crossbedded sediments exposed in the lower part of the gravel pit south of Touchet are deltaic foreset beds, though the component material is unusually coarse for the deltaic environment. If they are foreset beds they have been overridden by the finer and nearly-horizontal beds of the topset type. However, these hypothetical foreset

beds dip toward the east, which would imply that the delta was built forward from west to east, at least locally. This implied direction of advance is opposed by the westward slope of the restored terrace. Furthermore, the easternmost stratified sediments are 800 feet above sea-level, and therefore above the surface of any lake which could have been maintained by the rock barrier to the west.

Obviously, the erratic pebbles, cobbles, and boulders which are broadcast on the surface of the Gardena terrace and in the deposits which compose that terrace (pp. 101-105) bear critically on the hypotheses of origin. These erratics have been transported from far outside the Walla Walla drainage basin; presumably many of them were rafted by floating ice from the Columbia River. Some of these erratics are embedded in the sediments well below the surface of the Gardena terrace; clearly they were not transported into the basin after the terrace had been built. It is possible, however, that initially they were rafted into the basin in an epoch which antedated the Gardena terrace (p. 37) and that the terrace was built by streams which reworked the erratics with materials of local origin.

Conclusive evidence is not available to abate the dilemma created by the mutually exclusive environments of sedimentation which have been postulated in the preceding paragraphs. Both environments may have contributed to the building of the Gardena terrace, the two existing in different parts of the basin or at different times. A choice between them is intricately involved in the regional geologic history, which is beyond the scope of the present investigation and report.

[fol. 160] It is reported by Benjamin Brown, retired from the staff of Whitman College, in Walla Walla, that in July, 1933, he found an incomplete elephant tooth embedded in the unstratified silt of the Gardena terrace in a road cut at the T-intersection of the highways in the SE. ¼ sec. 2, T. 6 N., R. 36 E. This locality is about 20 feet below the initial level of the terrace and about 770 feet above sea level. Mr. Brown reports further that the lower jaw of an elephant containing two teeth was found in sand 16 feet below the surface of the terrace in excavating for the chapel at the penitentiary, at the northwest corner of Walla Walla, also that other teeth and a tusk of elephant and the femur from a camel have been found elsewhere in the ter-

race deposits. Specific classifications of these fossils are not available but the two genera represented suggest that the fine sediments of the Gardena terrace are of Pleistocene age, perhaps middle or late Pleistocene. The incoherent sediments which underlie the visible upper part of the terrace may well include deposits as old as late Tertiary.

[fol. 161] Water-bearing Properties

In general the fine sediments which compose the upper beds of the Gardena terrace contain much silt and have relatively little capacity to transmit ground water. In the eastern part of the area, where the Gardena terrace has been dissected into narrow elongate remnants, practically all the wells tap the highly permeable younger alluvium of the flood plains, and very few attempts have been made to recover water from the terrace deposits. In the western part of the area, however, on the Gardena irrigated tracts, the terrace deposits constitute the only source of water for domestic use. Wells of sufficient capacity must pass through the stratified silt and sand, usually 50 to 150 feet thick, and reach the coarser sand beneath. Maintenance of these wells is expensive because the pump valves are worn rapidly by the very fine sand which is suspended in the water, and because the pumping lift is large, the static level of the water being 75 to 90 feet below the surface.

[fol. 162] Even the coarse gravel and cobbles which compose the lower part of the terrace deposits locally do not yield much water; this is indicated by the small capacity of well 7615B1, deemed insufficient to supply the Walla Walla airport. However, sediments so coarse characteristically range widely in assortment, so that some gravel and cobble beds in the high terrace deposits may be highly permeable. Indeed, it may be these beds which supply some of the ground water recovered for irrigation on the Milton-Freewater fan. To be specific, the irrigation wells (p. 96) are commonly dug into the younger alluvium and are less than 50 feet deep but 26 wells are known to have been deepened by drilling in the bottom of the dug portion. The total depth of these composite wells—excepting 6533M1 and 6533M2, which penetrate into the basalt bedrock—ranges from 40 to 150 feet; the deeper ones may tap the coarse sediments of the terrace deposits.

Although the transmission capacity of the fine sediments is small, the water in the high terrace deposits seems not

to be perched at any place nor to be confined under regional artesian head. Consequently there seems to exist in these deposits a simple water table.

[fol. 163] One feature in the distribution of the relatively impermeable fine sediments of the high terrace deposits is believed to control the circulation and disposal of the ground water along the outer margins of the two young alluvial fans—the Milton-Freewater fan and the Mill Creek fan. These fans, which are composed of relatively permeable young alluvium (p. 55), divide along their outer margins into tongues of young alluvium which extend outward between the remnants of the terrace (Pl. 1) and which form the flood plains of the several distributary streams. Thus, along the outer margin of the Milton-Freewater fan, the young alluvium is constricted from a width of 5 miles to an aggregate width of 2½ miles in its tongues. Further, the inner or upstream tips of the radiating terrace remnants merge with and plunge gently beneath the young fans, and the fine sediments of the terrace deposits are known to extend somewhat below the level of the flood plains in nearby wells. From these relations it is postulated that the relatively impermeable fine sediments may underlie the flood plains at comparatively shallow depth along the outer margins of the fan. Conversely, it seems likely that the young aliuvium is constricted in thickness as well as in aggregate width. It is postulated finely, therefore, that the fine sediments of the high terrace deposits are so distributed about the inner tips of the terrace remnants as to reduce materially the aggregate capacity of the young alluvium to transmit ground water. Thus, it is tentatively concluded, a barrier to the circulation of the ground water is created, the water table is materially flattened above the barrier (pp. 67-68), and a fraction of the ground water is forced to the surface through the inner zone of springs (p. 89) as it passes over the barrier. An analogous condi-
[fol. 164] tion along the outer margin of the Mill Creek fan is suggested by the springs which exist above the small terrace remnants within the city of Walla Walla.

## Low Terrace Deposits and Young Alluvium

### Lithology, Distribution, and Source

The low terrace deposits, as the name implies, comprise the sediments which form the inconspicuous low terrace and

the beds of the creeks which are adjusted to that terrace. There are few exposures, chiefly in ditches dug for road drainage or for irrigation, and usually less than 5 feet deep. In most of these exposures the low terrace deposits are composed of well-assorted sand and silt, in massive beds; in some exposures they include pebbly silt. Thus, in the SW. ¼ SW. ¼ sec. 27, T. 7 N., R. 34 E., angular chips and poorly rounded pebbles of basalt are scattered unevenly through unstratified silt. Nowhere was gravel seen either in the exposures of the low terrace deposits or upon the low terrace. The thickness of the deposit and its character below the surface are known only from the records of four wells which are dug or drilled on the low terrace. These are Nos. 6521N1, 6528H1, 6530J2, and 7334K1 (pp. 262-272). Each of these wells penetrated silt and fine sand to a depth of 12 feet below the terrace and then entered gravel. In well 7334K1 the fine sand and silt rested directly on the thick body of gravel which seems to fill much of the Walla Walla Basin below the present stream beds. A well at Mud Creek school, in sec. 5, T. 6 N., R. 34 E., was drilled in the low terrace deposits and penetrated 60 feet of fine sand and silt before it entered gravel. However, this well is [fol. 165] situated at the edge of the Gardena terrace, a position which suggests that much of the sand and silt was part of the high terrace deposits. The bottom of the low terrace deposits is set, somewhat arbitrarily, at the base of the silt and fine sand; thus restricted, the deposits are probably not more than 20 feet thick. Doubtless, however, part of the gravel which occurs beneath the sandy silt is also a product of the epoch which culminated in the low terrace.

[fol. 166] The young alluvium comprises the sediments which form the flood plains and alluvial fans of the Walla Walla River and its tributaries. These sediments are exposed in several gravel pits and in the banks of the river channel, which is cut 6 to 12 feet below the flood plain. The young alluvium is generally of coarse texture. Above Whitman the flood plains of Mill Creek and of the Walla Walla River and their tributaries are floored predominantly with coarse gravel and cobbles which are coarsest about the apices of the respective fans. For example, in a gravel pit along the Mill Creek road just east of Walla Walla, in the SE. ¼ SE. ¼ sec. 16, T. 7 N., R. 36 E., the young alluvium

is exposed to a depth of 15 feet. There it is composed of coarse basalt pebbles and cobbles, subangular or poorly rounded, mostly less than 8 inches in diameter, rudely shingled, and commonly embedded in a matrix of sand and silt. There are a few boulders as large as 16 inches in diameter. The gravel on the Milton-Freewater fan is likewise coarse, unassorted, and poorly stratified. Downstream from these localities, the alluvium exposed in cuts on the fans and flood plains become- progressively finer. Thus, a gravel pit on the flood plain of the West Little Walla Walla River 2 miles northeast of Umapine, in the NE. ¼ NE. ¼ sec. 18 T. 6 N., R. 35 E., exposes a 2-foot layer of reddish-buff sandy and pebbly silt overlying 14 feet of unassorted coarse basalt gravel and cobbles with a matrix of silt and sand. There the largest cobbles are 8 inches in diameter. About 14 miles farther west, in the bank of the river channel south of Whitman, in the SW. ¼ NW. ¼ sec. 31, T. 7 N., R. 35 E., the upper 7 feet of the young alluvium comprises buff and gray sand, of fine and medium texture. Beneath this sand there is exposed 5 feet of basalt gravel and cobbles, iron-cemented, the largest cobbles being about 4 inches in diameter. Still farther west, the flood plain of the river 3 miles west of Whitman is underlain by [fol. 167] medium sand 2 to 5 feet thick, which overlies 4 to 2 feet of gravel composed of pebbles less than an inch in diameter. About 2 miles west of Touchet, the channel bank consists of 12 feet of very fine sand and silt in massive beds.

The thickness and character of the sediments which underlie the flood plains at depth are indicated by the records of wells 6523F1, 6533L1, 6534P3, 6533M1, 7525N1, and 7630L1 (pp. 263-276). Nos. 6533M1 and 6534P3, on the Milton-Freewater fan, penetrated gravel to depths of 230 feet and 280 feet, respectively. No. 7525N1, on the Mill Creek fan, penetrated gravel to a depth of 165 feet below the surface. What fraction of these thick deposits of gravel is the product of the present epoch of sedimentation and what fraction is the product of an earlier epoch or epochs is wholly conjectural.

The low terrace deposits are discriminated from the older or high terrace deposits of the Gardena terrace on the one

hand and from the young alluvium on the other by lithologic differences and by topographic position. In the western part of the area, they are discriminated from the deposits of the Gardena Terrace chiefly by their topographic position, in low terraces along wide valleys eroded deeply into the Gardena terrace. In texture and color, and other physical characteristics the sediments of the two deposits are similar; they are dissimilar in that the poorly exposed low terrace deposits lack the stratification, the sand and silt dikes, the minute faults, and the contorted bedding which characterize the deposits of the Gardena terrace. In the eastern part of the area a possible correlative of the low terrace deposits forms a few terrace remnants which are slightly above the flood plains and little if any below the Gardena terrace. These remnants, tentatively mapped as high terrace deposits, may well be correlative with the low terrace. Several of these remnants occur within the city limits of Walla Walla (Pl. 1).

[fol. 168] From the coarse-textured young alluvium the low terrace deposits are discriminated both by their lithologic character and, in the district west of Whitman, by their topographic position. In that district the low terrace deposits stand everywhere above the flood plains, which seem to be the product of erosion that has worked headward from the upper end of the gorge at Reese. Farther upstream the flood plains stand higher and higher with respect to the low terrace. Indeed, in the eastern part of the area, the young alluvium has been built so high in the fans of the Walla Walla River and of Mill Creek that it seems to have buried the upstream ends of several remnants of the low terrace and may now be burying them even deeper. Thus, in places it was difficult to trace precisely the boundary between the two sedimentary deposits and recourse was taken, somewhat arbitrarily, to the discrimination of the soil types[8] to fix the boundaries on the geologic map.

[fol. 169] Certain minor tributaries, such as Cottonwood and Birch Creeks, south of Walla Walla, are still adjusted

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[8] Powers, W. L., and Youngs, F. O., Relative duty of water classification of lands under the Walla Walla River and tributaries, Umatilla County, Oregon: map (unpublished), 1932.

to the low terrace, and their flood plains stand above the contiguous flood plains of Yellowhawk Creek and of the Walla Walla River respectively. Likewise, the flood plain of Doan Creek is adjusted to the low-terrace stage of Mill Creek, so that in the SW. ¼ of sec. 33, T. 7 N., R. 35 E., it stands terrace-like, 10 feet above the flood plain of the Walla Walla River in the gap between two remnants of the Gardena terrace. Complete discrimination of the young alluvium from the low terrace deposits in these places was not undertaken for lack of time.

The small relief between the low terrace and the flood plains, together with the present adjustment of many of the minor tributaries to the low-terrace stage, all suggest that there is only a slight difference in age between the young alluvium and the low terrace deposits. Both sediments are alluvial and are the product of one general epoch in which the streams first dissected the Gardena terrace and then, by alluviation, adjusted themselves to a local base level. Both may be largely post-Pleistocene in age.

[fol. 170] Water-bearing Properties

The young alluvium is relatively permeable. The wells used for irrigation have commonly been dug only a few feet below the water table, but even so most of them have moderate capacity (pp. 96-98. It is characteristic of alluvial deposits, however, that they are heterogeneous with respect to the size and to the degree of assortment of their constituent particles. Consequently, the permeability of an alluvial deposit and its capacity to transmit water are likely to range widely from place to place. This characteristic is disclosed in the gravel which forms the bed of the Walla Walla River from Milton down stream to the outer margin of the young alluvial fan. There the gravel in some spots is unassorted and the interstices between the cobbles and pebbles are entirely filled with sand and silt, so that the whole deposit is compact and presumably is not highly permeable. Elsewhere, on the other hand, the gravel is largely free of fine particles and is quite loose so that it is probably moderately or highly permeable.

[fol. 171] Generally, the ground water in the low terrace deposits and young alluvium seems neither to be perched nor to be confined under artesian head, particularly beneath the Milton-Freewater fan. Thus, the water levels in the

wells—both in the shallow wells which are dug and in many of the deeper wells which are drilled in whole or in part—are accordant in any particular small district. The same conditions seem to prevail in the deposits of the Gardena terrace, certainly in the stratified sand and silt fraction and commonly in the gravel fraction which underlies it. A possible exception, however, is one well in the western part of the valley, No. 7333N1, which is drilled 275 feet deep and flows slightly from unconsolidated deposits. No other wells which tap the unconsolidated deposits of the valley are known to flow and it seems likely that this one well reaches far below the base of the young alluvium. Thus it seems that a simple water table exists.

Other features of the behavior of the ground water in the unconsolidated sediments of the Walla Walla valley are discussed at length in the following sections of the report.

[fol. 172] Water Table in the Walla Walla Basin

General Features of Water Tables

As has been brought out in the discussions of the water-bearing properties of the stratigraphic units, the water contained in the young alluvium and low terrace deposits and in the upper part, at least, of the high terrace deposits (Gardena terrace) seems to exist under a water-table condition. Under this condition the interstices in the permeable sand and gravel members are entirely filled with water up to a certain level—the water table—which ordinarily corresponds to the water level in shallow dug wells. Also, the water which is stored in the zone of saturation—that is, below the water table—is analogous to water impounded in a reservoir, for where the water table occurs in permeable rocks it is free to rise and fall as the quantity of stored ground water increases or decreases.

[fol. 173] Unlike the water surface of a reservoir, however, the water table is not a horizontal plane but is analogous to a land surface with its ridges and valleys. Commonly, this uneven form is depicted on a map by contours drawn on the water table as of some particular date; thus, the slopes of the water table from place to place are shown as on a conventional contour map of the land surface. The water in the zone of saturation is not static but ordinarily is in slow motion. In general, the ground water at any

particular place moves in the direction of the steepest slope of the water table at that place. The water table beneath an area in which extensive ground-water recharge is taking place commonly stands relatively high, so that the ground water moves away from that area toward an area of discharge, beneath which the water table is relatively low. Thus, the water table beneath an area of recharge commonly forms a prominence or ridge and beneath an area of discharge it forms a depression or valley.

Where the water table occurs in homogeneous material, its rise and fall measure proportionately the corresponding amounts of water which are added to or withdrawn from storage in the permeable material. Likewise, the slope of the water table is proportional to the velocity of the ground water. Natural water-bearing materials are, of course, not homogeneous but the rise and fall and the changes in slope of the water table indicate relatively the changes in storage and velocity.

[fol. 174] Form and Depth of the Water Table

The form of the water table in the eastern part of the Walla Walla Basin is indicated on an accompanying map (Pl. 5) by contours of the water table drawn as of June 29

Plate 5.—Map of the eastern part of the Walla Walla Basin, showing contours and amount of rise and fall of the water table.

and August 29, 1933, based on the altitude of the water surface in 109 observation wells. On or about June 20, the date of the earlier contours, the water surface in most of the observation wells in the vicinity of Milton and Freewater was at the highest position it had held in the period beginning May 1, 1933. At that time it probably held also its highest position in the period extending back to December 1, 1932, about which date float gages were installed in nine key observation wells. By August 29, the date of the later contours, the water table had receded materially from its high position, owing in part to pumping from wells for irrigation (pp. 96-98), but it was still falling and in part of the key wells had not receded to its lowest known position, which occurred in the preceding February or March. The preparation of other contour maps to represent the form of the water table in critical positions at other times

of the year must await the gradual accumulation of the necessary base data.

For convenience in description, the water table of the Walla Walla Basin is divided into three segments: first, a northern segment which underlies the alluvial plains of Mill, Stone, and Yellowhawk Creeks and which is designated as the Mill Creek segment; second, a central segment which underlies the young alluvial fan of the Walla Walla River and its distributaries and which is designated the Milton-Freewater segment; third, a southern segment underlying the alluvial plain of Dry Creek (in Oregon) and termed the Dry Creek segment.

[fol. 175] Both sets of contours on the Mill Creek segment of the water table (Pl. 5) are composed of straight parallel lines which trend about S. 20° E.; thus the water table on both June 20 and August 29, 1933, was approximately plane and descended westward from 1,000 feet above sea level in the eastern part of Walla Walla to 600 feet above sea level at Whitman. In this reach, the slope of the water table decreased progressively from 65 feet in a mile at Walla Walla to about 35 feet in a mile near Whitman, a relatively steep slope among water tables in alluvial deposits. Beneath the apex of the Mill Creek fan, at the eastern edge of Walla Walla, the water table in June was about 33 feet below the land surface but farther west its depth became progressively less so that it was 14 feet below the land surface in the eastern part of College Place, and 8 feet below at Whitman. Its form and depth still farther west are not known. This segment terminates on the south, in Washington, beneath the Walla Walla River, where the contours of the water table swerve sharply toward the southwest.

The Milton-Freewater segment of the water table abuts on the Mill Creek segment on the north and on the Dry Creek segment on the south, the respective boundaries being the Walla Walla River as already described and a line which passes through Freewater and along Dugger Creek to the head of the Schwartz spring branch. On the Milton-Freewater segment, the two sets of water-table contours were essentially concentric about the apex of the alluvial fan at Milton. Thus this segment of the water table formed a rude cone which descended northward and westward from its apex to and beyond the Oregon-Washington boundary

and at least as far as Whitman and Umapine. Near the apex of the cone the water table was about 1,000 feet above sea level; 8 miles to the northwest, at the edge of the mapped district, it was 400 feet lower, or 600 feet above sea level.

[fol. 176] In the Milton-Freewater segment also the slope of the water table decreases progressively from 65 feet to the mile near its head to about 35 feet in a mile between the 650-foot and 600-foot contours south of Whitman. In this segment, however, the smoothness of the water table is broken by one prominence which is postulated to be related to the distribution of the relatively impermeable high terrace deposits (Gardena terrace) and to the springs on the alluvial plain (pp. 54, 92). This is depicted by periodic profiles of the water table between wells 552B1 and 6514K1, that is, from Freewater northward along the highway to the Oregon-Washington boundary (fig. 4). Thus, from well 6526P1 northward through wells F1 and B2 to well 6526B1,

Figure 4.—Profiles of the water table from well 552B1 north along highway to well 6514K1.

the slope of the water table on June 20, 1933, was essentially constant and amounted to 44 feet in a mile. Farther north, the water table descended 21 feet in 0.1 mile to the orifice of spring 6523P12 and then continued with a slope of 48 feet to the mile. South of well 6526P1, toward the apex of the alluvial fan, the slope was approximately 65 feet to the mile. The slopes indicated by the profile would be somewhat less than the maximum gradient through any particular point, for the profile is drawn obliquely to the water-table contours. These data define a prominence of the water table whose crest occurred in well 6526B1 immediately south of the spring and stood about 13 feet above the general slope. This prominence seems to have persisted since August, 1932, and to have been most pronounced when the water table stood lowest. For example, on April 4 to 6, 1933, the water table along the line of the profile stood in its lowest known position; at that time it [fol. 178] sloped northward about 55 feet to the mile from well 552B1 to 6535K2, then steepened to at least 80 feet to the mile, and flattened to about 18 feet to the mile just south of the spring, that is, between wells 6525F1 and 6526R1. Plate 5 suggests that the water table, in its out-

ward slope from the apex of the alluvial fan, generally flattens in this fashion immediately above the inner zone of springs and then steepens beyond. Thus, the prominence on the water table seems to be an outward-sloping arcuate terrace which extends nearly if not quite across the segment. The front of this terrace lies approximately beneath the heads of the constricted tongues of young alluvium which have been postulated on page 54. Accordingly it is presumed that the form of the water table reflects this constriction in the permeable young alluvium, the percolation of the ground water being impeded to such an extent that the water table is flattened above the barrier and is steepened beyond.

(Here follows 1 photo, folio 177)

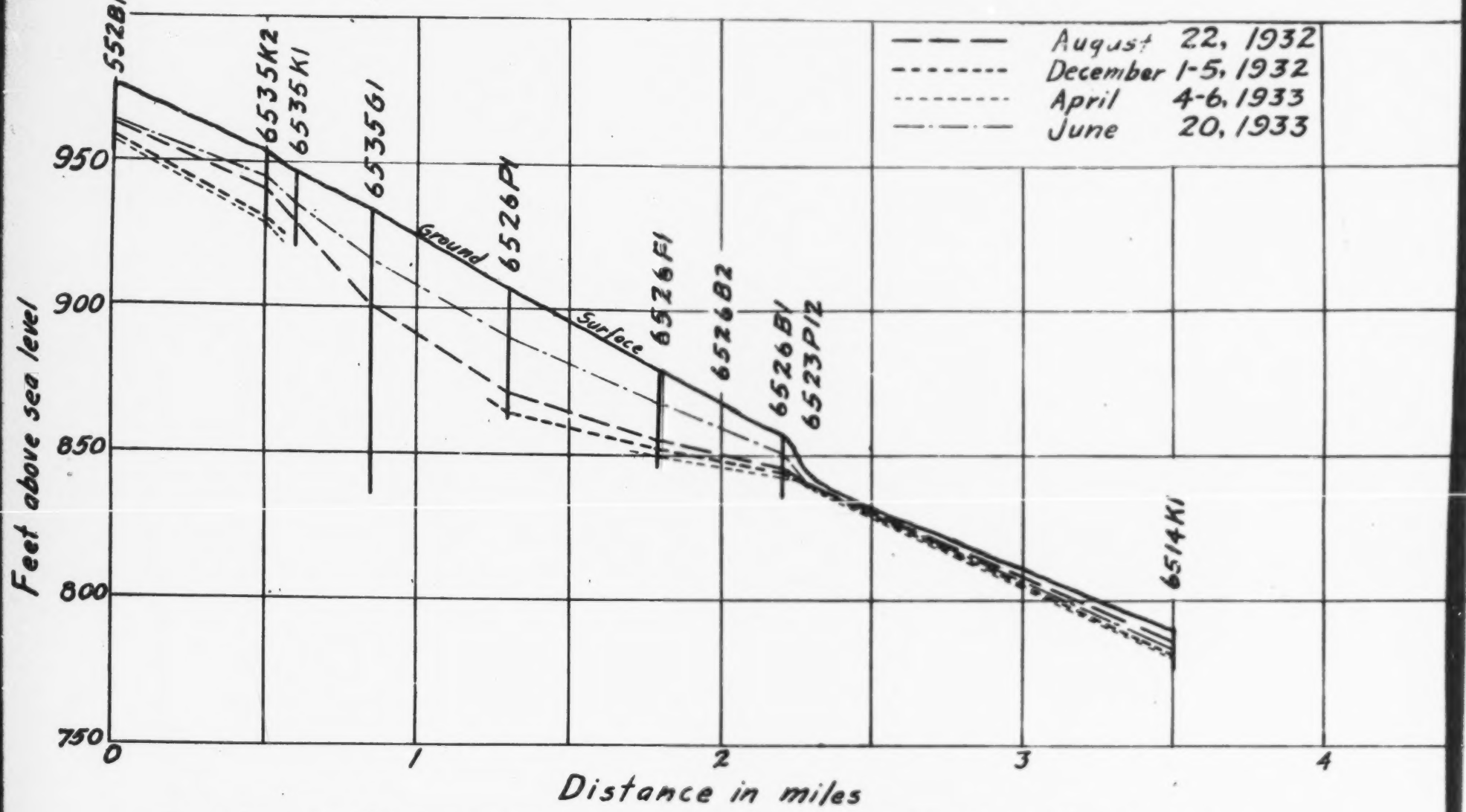


Fig. 4. — Profiles of the water table from well 552B1 north along highway

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In June, 1933, when it stood highest, the water table was 12 to 16 feet beneath the land surface above the 950-foot contour near Freewater. Toward the northwest its depth became progressively less as far as the inner zone of springs, where it intersected the land surface in many of the shallow drains. Beyond this zone of springs, the water table was generally less than 10 feet beneath the land surface. In the preceding April, however, the water table stood much lower; midway between Freewater and the inner zone of springs it was more than 40 feet below the land surface.

Little is known as to the form and depth of the water table in the Dry Creek segment. However, the sharp deflection of the 500-foot contour toward the west between South Mud Creek and the Schwartz spring branch west of Umapine, suggests that there also the form may have been conical with an apex beyond the area in which the form of the water table was mapped.

[fol. 179] Fluctuations of the Water Table, 1932--33

The water table at any point is constantly in motion, either rising or falling. The rate and amount of the rise or fall range widely at different places and at different times of the year, depending upon the position of the water table with respect to the source and disposal of ground water.

In the Walla Walla Basin, the water table has fluctuated repeatedly through a relatively wide range, even during the short term of the investigation, and especially in wells located in the higher part of the Milton-Freewater segment. The period of duration of any one cycle of fluctuation has ranged from a few days to several months, and both the brief and the extended fluctuations have ranged through several feet or even tens of feet. Fluctuations have been recognized in response to changes in the flow of the surface streams, rainfall, irrrigation in the district adjacent to the observation well, and protracted pumping for irrigation. Commonly two or more of these agencies have acted at the same time.

[fol. 180] Fluctuations of the water table in response to changes in the flow of the streams are well represented by the accompanying hydrographs for well 6525P1, owned by U. H. Hayden (fig. 7, p. 171), and for the combined flow

of the north and south forks of the Walla Walla River (fig. 3, p. 24). The well is situated less than 0.1 mile west of the river channel. The flow of the river is measured above the fork and about 8 miles upstream from the well. As a result of the spring freshet, the flow of the river increased from 335 cubic feet a second to 805 cubic feet a second between April 19 and 28, and then decreased to 345 cubic feet a second on May 11. In the corresponding interval the water level in the well had risen 10.2 feet by May 5, after which it had receded 1.8 feet by May 14. After May 11 the flow in the river again increased, was continuously more than 575 cubic feet a second from May 25 to June 14, and in that period thrice rose to 725 to 750 cubic feet a second. In this interval the water level in the well rose 4.9 feet above its recession level of May 14 so that on June 6 it reached its seasonal peak, which was 13.3 feet above its low position of April 18 before the freshet began. On June 9 the freshet reached its final peak, then receded steadily. On June 21, the channel opposite the well was nearly dry, owing to the decline of the freshet and to diversions below the gaging stations; a day or two later water ceased to flow entirely. As the river declined, the water level in the well dropped rapidly and had receded 19 feet before pumping from the well began some time after July 20. Thus, the water level in the well responded readily to fluctuations in the flow of the river, though it lagged 2 to 7 days behind. The greatest lag, as would be expected, was behind the first peak of the freshet, before which the permeable members of the alluvium had drained to the lowest position of the water table.

[fol. 181] Corresponding fluctuations of the water table in this same interval occured in wells 6526B2, 6527K1, 6534B1, 6535K1, and 6536H1 as the respective hydrographs show. In these the water table rose 12 to 30 feet in response to the 1933 freshet but lagged 2 to 20 days behind the river. This lag indicates that the wave of ground water replenishment moved outward at an approximate velocity 0.15 to 0.2 mile a day. All these wells are situated below the apex of the Milton-Freewater fan but above the inner zone of springs. In wells 6526P1 and 6534P1, the water-table rose in analogous fashion, but seems to have been influenced materially by rainfall and by irrigation. In the climatic year beginning October 1, 1932, the flow of the river twice exceeded the

freshet of April though only for short periods. On November 17, 1932, it attained its greatest daily discharge of the year, 1,060 cubic feet a second; on January 8, 1933, the daily discharge was 940 cubic feet a second. These fluctuations also seem to have their response in the observation wells, though the water table rose much less than in the following April and lagged much farther behind the river. Tentative correlations of fluctuations in the stream and in the wells suggest that the lag ranged from about 40 days in well 6535K1 to about 65 days in well 6534P1 and that the corresponding velocity of the ground-water wave was of the order of 0.03 to 0.05 mile a day.

Fluctuations of the water table induced by fluctuations in the flow of the Walla Walla River are further shown by the hydrograph for well 551A2 (fig. 6, p. 113), which is situated high on the young alluvial fan. Here, the total range in fluctuation is only 5.1 feet from March 2 to June 1, and the lag after the river is only one or two days.

[fol. 182] Fluctuations of the water table in response to rainfall are recognized tentatively in wells 6525P1, 6526B2, and 6526P1, especially in the latter. These are disclosed by comparison of the respective hydrographs (figs. 7, 8, 9) and of a diagram of rainfall at Milton (fig. 2, p. 11.) Thus, between December 1, 1932, and March 3, 1933, there were eight stormy periods in which more than 0.25 inch of rain fell. During this time, vegetation was essentially dormant and would not have exerted any draft upon the soil moisture. Each of these eight storms corresponds to a rise of the water level in well 6526P1, the rise lagging 3 to 5 days behind the storm. Two such fluctuations in the well are inordinately large in comparison to the others, that is, those on December 10 and January 8. These two are approximately coincident also with increases in the flow of the river and are perhaps due to the combined effects of rainfall and of stream flow. Each of the three wells whose records seem to indicate a correlation between rainfall and fluctuations of the water level are adequately curbed so as to exclude rain water from the top of the well. It is not unlikely, however, that the rainfall percolated through the soil to a moderate depth, entered the well not far below the curbing, and trickled down the walls. If this were the actual process the rise of the water level in the well might have been materially greater and much earlier than the

corresponding ultimate rise of the general water table. Between March 3 and April 29 comparatively little rain fell and presumably that which penetrated the soil was quickly dissipated by active vegetation. In this period the water level in wells seems not to have fluctuated in response to rainfall. Still later, all fluctuations related to rainfall would have been entirely unrecognized because of the much greater rise in response to the spring freshet.

[fol. 183] Fluctuations of the water table produced by downward percolation of irrigation water are shown by the hydrograph of well 6534P1 (fig. 12). According to the owner and observer, John Irons, irrigation about his well began on April 2, 1933, and continued for five days until April 7. During this period the water level in the well rose 9.8 feet, or nearly 2 feet a day. Irrigation was discontinued April 7 to 16; the water level in the well receded immediately and had fallen 7.3 feet by April 13. In the next three days the water level rose about 0.5 foot, possibly part of a general rise induced by the spring freshet in the river. On April 16 Mr. Irons began to irrigate again and irrigation in that vicinity is presumed to have been general until April 29. In this period the water level in the well rose steadily except on April 18 and 25, when Mr. Irons stopped irrigating for a short time and when the water level receded slightly and temporarily. The period April 29 to May 24 was stormy and 2.61 inches of rain fell so that there was little irrigation; the water level rose 2.5 feet. After May 4 irrigation was again general and the water level rose steadily until June 26 when it stood 17.6 feet above its recession level of April 13. Though, doubtless the water table rose materially owing to irrigation in this period, it remains problematic what portion of the aggregate rise represents the general effect of the freshet in the Walla Walla River. Similar fluctuations of the water table in response to irrigation are shown by the hydrograph for well 6526P1, owned by O. K. Goodman (fig. 9), and have been observed in wells throughout the irrigated district.

[fol. 184] The fluctuations of the water level caused by protracted pumping from wells are opposed to those induced by the freshet and by irrigation. If the pumping in an area is general, the water level invariably falls in pumped and non-pumped wells alike and generally continues to fall throughout the pumping period. During the

1933 season, intensive pumping for irrigation began along the southern margin of the Milton-Freewater fan on July 5 when water was shut off from the Pleasantview irrigation ditch, which serves that district. The area of pumping spread gradually until by the end of the month it covered practically all the fan above the inner zone of springs. As the pumps were started the water table fell sharply in the nearby wells.

[fol. 185] Fluctuations of the water table owing to pumping are best illustrated by the hydrograph for well 6534P1 in July and August (fig. 12). This well was equipped with a pumping plant having a capacity of about 200 gallons per minute, which was operated constantly July 5 to 11 and July 16 to 29. Thereafter it was operated intermittently to and after the end of the period represented by the hydrograph. The hydrograph shows that on July 16 and 30, and on August 11, 21, and 25 the water level rose briefly to a peak and then declined. These fluctuations obviously resulted from intermittent pumping, the water table seeking equilibrium during the periods of idleness. A line drawn on the hydrograph tangent to the several sharp peaks of July and August would indicate approximately the lowest possible position of the water table had there been no pumping. The recession of the water table below such a line, 6.5 to 10 feet in the period July 16 to 29, is a minimum measure of the combined effect of pumping in the observation well and in other wells of the vicinity.

[fol. 186] During July and August the water table declined in all observation wells located in the area of pumping and in other wells along the edges of that area, the maximum observed drop being 28 feet in wells 6525B1 and 6525P1. However, it is uncertain that all of this decline is the effect of pumping. Thus, in well 6525P1 (fig. 7) the water level stood highest on June 6 and receded rapidly after June 21 as the freshet in the river declined. On July 10, before any irrigation pumps were started in the vicinity, it stood 15.8 feet below its highest position. The pumping plant in the observation well was operated in the late part of July but it seems that the pumping did not accelerate the recession of the water table greatly. Further, in well 6526B2 (fig. 8), in which a water-stage recorder was being operated, the water level stood highest on June 24 and receded at a nearly constant rate until it stood 4.1 feet

lower on July 12; on that day the pumping plant in the well was started. Thereafter the decline of the water table was accelerated only slightly although the pump was operated continuously until August 2. Between August 5 and 10 the water level rose 1.1 feet, presumably as nearby pumps were shut down. On August 27 the pump in the observation well was shut down and the water level appears to have risen nearly if not quite to its normal position by August 28. Although on this date the water level in the well stood 8.7 feet below its high position of June 24, it seems that the decline owing to pumping may not have exceeded 2 or 3 feet at any time. In well 6527K1 (fig. 10), which is situated on the northern or lower edge of the area of pumping, the recession of the water table was accelerated somewhat after July 15, when pumping became general. However, if the rate of recession from July 1 to 15 is accepted as indicating approximately the normal rate of fall, then only a minor fraction of the decline in July and August would seem to have been caused by pumping.

[fol. 187] The net change in the position of the water table between June 20 and August 29—on account of fluctuations related to stream discharge, to irrigation, and to pumping—is indicated on Plate 5 by lines of equal rise or fall. Also, the areas which correspond to each 5-foot range in rise or fall are indicated by shading. Thus, it is shown that over most of the area represented by the map the water table fell, and generally fell less than 5 feet. However, in the Milton-Freewater segment, between Freewater and the inner zones of springs, the water table fell more than in other parts of the area, the greatest fall exceeding 20 feet and being along a line which trended N. 80° E. through secs. 25 and 33, T. 6 N., R. 35 E. Inasmuch as the lines of equal rise or fall are not contours on an actual surface they do not indicate that a depression existed in the water table beneath this part of the area in August, as might be inferred from a casual inspection of the map. Actually the water table sloped so steeply in June that the 20-foot fall merely flattened the slope locally and steepened the slope nearer the apex of the fan. This change in the slope of the water table has been mentioned on page 67 but will bear repeating. Thus, between the 850-foot and the 900-foot water-table contours along the Walla Walla River the average slope of the water table was 50 feet to the mile on June

20, and 46 feet to the mile on August 29. Farther upstream, between the 900-foot and the 950-foot contours, the slope increased in the same period from 62 feet in a mile to 96 feet in a mile. It has been postulated on page 67 that the water table had been flattened even more in April, 1933.

[fol. 188] The hydrographs for the observation wells in which float gages were operated (figs. 6-14) and the profiles of the water table northward along the highway from Freewater (fig. 4) suggest that in the district above the inner zone of springs on the Milton-Freewater fan, the water table has passed through a striking cyclic fluctuation in the year beginning in August, 1932. Thus, along the line of the profile, the general trend of the water table was constantly downward from August, 1932, until the following April, even through general pumping for irrigation ceased in August and though there intervened relatively large fluctuations which were related to fluctuations in the stream flow and possibly to rainfall. This continual downward trend of the water table also prevailed in most of the wells which were observed beginning in December, 1932. From these data the ordinary regimen of this district is postulated tentatively. First, the water table rises to its highest position as the spring freshet passes down the Walla Walla River, and as a related major ground-water wave passes outward through the permeable alluvial deposits. Second, the water table recedes rapidly as the freshet fails and as the major wave passes outward, and continues to recede more and more slowly until the next annual freshet occurs. Third, the fluctuations induced by smaller peaks in the flow of the river, by rainfall, by irrigation, and by pumping are ordinarily of secondary magnitude and are impressed upon the major cycle. This concept is somewhat obscured by the facts that extensive irrigation on the alluvial fan commonly begins as the major ground-water wave is advancing and that the distribution of surface water for irrigation commonly ends and the irrigation pumping plants on wells [fol. 189] begin to operate as the major wave recedes. Thus, it has not been possible in the brief term of the investigation to discriminate satisfactorily the rise induced by the river freshet from the rise caused by irrigation, nor to discriminate the decline associated with the passing of the freshet from that caused by general pumping. This concept does explain in a rational fashion one fluctuation of the water

table that otherwise would be anomalous. Thus, in a number of wells, as in well 6526B2 (fig. 8), the water table fell 6 to 10 feet in early March, 1933, and stood relatively low until mid-April. In this period little or no rain fell, the flow of the river was relatively low, and general irrigation had not begun. Thus the opportunities for ground water recharge were at a minimum, and the minor ground water waves set up by earlier rainfall and by the November and January peaks in the stream were wholly dissipated before the major wave began. Confirmation or refutation of the concept necessarily depends upon checking the corollaries of the concept against the actual fluctuations observed in a number of key wells over a more extended term than that of the present investigation. Incidentally, if the Walla Walla River were a perennial stream entirely across its alluvial fan, it would follow from this concept that: first, the recession of the major ground water wave would be more gradual than that observed in 1933, and, second, the water table in its low position would stand materially higher in wells between Freewater and the inner zone of springs than it did in the low position observed in 1932 and 1933.

[fol. 190] Beyond the inner zone of springs in the Milton-Freewater segment and throughout its Mill Creek segment, the water table seems to have fluctuated through a much smaller range but in response to the same forces as those active above the zone of springs. In these districts the altitude of the water table was nowhere as much as 10 feet lower in August, 1933, than in the preceding June (Pl. 5) and generally was less than 5 feet lower. The least decline of the water table between these two dates seems to have been along or just beyond the inner zone of springs; there it is not known to have exceeded 3 feet. In one triangular area, which lies along the Oregon-Washington boundary line in secs. 13, 14, 23, and 24, T. 6 N., R. 35 E., the water table stood as much as 1.2 feet higher on the later date. It is problematic whether this area of rising water table represents the extreme advance of the major ground water wave passing down the Milton-Freewater fan or whether it results wholly or in part from the penetration of irrigation water. The position of the water table was observed in only a few wells in these districts before May, 1933. Thus, the data now available covers a term much too short to per-

mit generalizations as to the usual regimen of the water table.

## [fol. 191] Relation of the Water Table to the Source and Movement of the Ground Water

With respect to the source, movement, and disposal of ground water, the Mill Creek and Milton-Freewater segments of the water table were independent of one another in 1933. As Plate 5 shows, the contours on the water table coursed about S. 20° E. across the Mill Creek segment and then swerved sharply S. 55°-75° W. as they entered the Milton-Freewater segment. Accordingly, the boundary between the two segments was a well-defined trough in the water table toward which ground water was moving from the north and from the south. The axis of this trough coincided with the Walla Walla River from about the Oregon-Washington boundary westward to Whitman. It seems obvious that this relation between the two segments is essentially permanent, because each segment of the water table slopes so steeply that the axis of the trough would not be shifted materially except by a great depletion of the ground water in one segment with respect to the other. The relation of the Milton-Freewater segment to the Dry Creek segment, which it adjoins on the south, is not known.

[fol. 192] From the apex of the alluvial fan at Milton downstream about to the McCoy bridge, which is situated on the boundary between secs. 24 and 25, T. 6 N., R. 35 E., the water table sloped away from the Walla Walla River toward the northeast and the northwest in both June and August, 1933 (Pl. 5). Therefore, the water in the alluvium was percolating away from the river. The major rise and decline of the water table which began in April and extended into July has been shown to reflect faithfully a corresponding fluctuation in the flow of the river. This rise and decline has been observed in wells as much as 2 miles away from the main channel of the river and 3 miles from the apex of the fan. Lesser fluctuations of the water table between December and March have been shown to reflect other fluctuations in the stream flow. In May and June, 1933, the water surface of the river seems to have been essentially continuous with the water table while water was

flowing through this reach of the stream channel. At that time the water in the river stood less than 5 feet above the water surface in wells that are less than a tenth of a mile away, and the apparent gradient from one water surface to the other conformed approximately to the established gradient of the water table farther away. The young alluvium, which forms the stream bed, is permeable. It seems obvious, therefore, that the major ground-water waves which have passed through the alluvium opposite this reach of the stream were supplied by water lost from the river by seepage, at least in large part. In August, 1933, when no water was flowing in the river channel from the railroad bridge at Freewater downstream nearly to the McCoy bridge, the form of the water table indicated that the ground water in the alluvium was still draining away from the river, even though the water table stood as much as 25 [fol. 193] feet below the river bed in wells nearby. Clearly the river is a losing stream in this reach. In August, 1933, water was flowing in the river channel from the McCoy bridge downstream to the interstate boundary and on to the confluence with the Columbia River. Hence, this reach of the Walla Walla River was at that time a gaining stream (p. 95). The form of the water table suggests that it gains perennially.

In respect to the form of the water table, the distributaries of the Walla Walla River (p. 22) are analogous to the main channel and might likewise be losing streams. Individually they have much less capacity than the main channel and their beds appear to be less permeable because composed of gravel which contains much more fine material. However, the form of the water table is not known in sufficient detail to indicate whether or not the Milton-Freewater segment does receive water by seepage from any or all of the distributaries.

[fol. 194] Given the conical form of the water table defined by the contours of June and August, 1933 (p. 67), ground water in the Milton-Freewater segment would percolate northward and northwestward away from the apex of the fan and ultimately would reach the most remote parts of the segment in both Oregon and Washington unless it were sooner discharged. Down this cone would pass the successive recharge waves, their height decreasing as the length of the wave front increased in advancing outward

from the apex. Beyond the spillway formed by the constriction in the young alluvium (p. 54), where each wave would presumably be dissipated in a measure by overflow among the inner zone of springs (p. 92), these waves would seem to become much less prominent than in the vicinity of Milton and Freewater. These postulated conditions seem to obtain throughout the range between the highest and lowest positions of the water table now known. Inasmuch as the water table would retain its general conical form unless there were a truly great decline beneath the apex of the fan at Milton it seems likely that the manner and direction of the ground-water circulation would persist through a considerably greater range in fluctuation of the water table. However, should the stream regimen at any time differ greatly from that observed in 1932 and 1933 it seems likely that the magnitude and persistence of the recharge waves would be affected accordingly.

[fol. 195] It has been shown on pages 72 and 73 that the water table seems at times to fluctuate in response to irrigation on the alluvial soil and in response to protracted rainfall in the non-growing season. Accordingly, it is presumed that a material quantity of ground water may be derived from these sources. However, so steep was the water table throughout the Milton-Freewater segment in 1933 that nowhere was the quantity of water received by penetration of irrigation water or of rainfall large enough to mask the conical form of the water table even locally. Accordingly, it seems that nowhere was the quantity sufficient to affect materially the direction or relative velocity of the percolating ground water.

[fol. 196] Disposal of the Ground Water

## Springs

### Location and Character

Many perennial springs issue from the younger and intermediate alluvium of the Walla Walla Basin, especially in the area underlain by the Milton-Freewater segment of the water table. Most of these springs are described in an appended table which is based on a canvass of the southeastern part of the area made in May and June, 1933. A few springs which rise in or near the distributary channels of

the Walla Walla River may have been overlooked because they were drowned by the streams when the canvass was made. A number of the springs enumerated in this canvass are in reality groups of springs, each comprising several orifices so close to one another that it was not feasible to indicate each orifice on the map.

(Here follow tables, side folios 197-198.)

[fol. 197]

Record of Springs in the Walla Walla Basin, Oregon and Washington

| Number | Owner | Name | Altitude[1] Feet above sea level | Source[a] | Maximum Number of openings | yield[a] Second-feet | Date | Temperature of | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1933 | | |
| 6413Q11 | M. O. Beauchamp | South Mud Creek | ..... | Younger alluvium | 6+ | 10+ | .... | 52 | Many feeders below h |
| 6423H11 | Emil Mueller | North prong of Schwartz Spring Branch | ..... | do | Several | [a] 4.8 | June 6 | .. | |
| 6423R11 | ..... | South prong of Schwartz Spring Branch | 627.6 | do | do | [a] 6.8 | June 13 | 52½ | |
| 6424P11 | Dr. Marshall | do | 644.2 | do | do | ... | .. | .. | |
| 6425B11 | J. M. Marlatt | do | ..... | do | 1+ | ... | .. | 54 | |
| 654N11 | ..... | ..... | ..... | do | 1+ | ... | .. | .. | Rises in boggy area |
| 657L11 | ..... | Mud Creek | ..... | do | Several | 1+ | .. | 52 | do |
| 6510H11 | ..... | ..... | ..... | do | do | ... | .. | .. | |
| 6510L1[illegible] | Jussand Live Stock and Land Co. | McEvoy Spring | 735+ | do | do | [a] 5.8 | July 5 | 58 | |
| 6513P11 | ..... | ..... | ..... | Gardena terrace deposits | do | .5 | May 25 | .. | do |
| 6516H11 | ..... | ..... | 732.6 | Younger alluvium | do | [a] 3.2 | June 20 | 52 | |
| 6516N11 | Fred Kralman | Branch of East Mud Creek | ..... | do | 3+ | 5+ | .. | .. | |
| 6516P11 | John B. Rencken | do | ..... | do | Several | ... | .. | .. | Nearly dry in winter |
| 6520F11 | Herman Markman | North Branch of So. Mud Creek | ..... | Intermediate alluvium | 1 | 2.5 | .. | .. | |
| 6520J11 | Phillip Murphy | South Mud Creek | 723.9 | Younger alluvium | Several | 3 | .. | .. | Rises in boggy area |
| 6522N11 | James Overturf | Behnke Spring | 800.1 | do | 1 | .5 | .. | .. | |
| 6522P11 | J. Hansen | East Mud Creek | ..... | do | 2 | 1. | .. | .. | |
| 6522Q11 | ..... | Ford Branch | ..... | do | Several | 10. | .. | .. | Combined yield of 6526A11 |
| 6523D11 | A. T. Haun | ..... | ..... | do | 4 | .5 | .. | .. | Rises in boggy area |
| 6523L11 | ..... | East prong of Little Walla Walla | ..... | do | Several | [a] 1.6 | June 5 | 55½ | Combined yield of 6523Q11 |
| [fol. 198] | | | | | | | | | |
| 6523M11 | ..... | ..... | ..... | Younger alluvium | Several | .5 | .. | .. | |
| 6523P11 | M. M. Dyer | Lewis Spring | 834.1 | do | do | [b], [a] 2.4 | June 12 | .. | |
| 6523P12 | — Downing | Downing Spring | 839+ | do | do | ... | .. | .. | |
| 6523Q11 | ..... | ..... | 841.0 | do | do | ... | .. | .. | For yield see 6523L11 |
| 6523Q12 | Hittle, Harp, and Jensen | ..... | 837.7 | do | do | [a] 3.9 | June 5 | .. | |
| 6523R11 | Livingston ? | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| 6524N11 | — Armstrong | do | ..... | do | 1 | 1.0 | .. | .. | |
| 6524P11 | W. W. Higgens | East prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| 6524P12 | do | do | ..... | do | 1 | ... | .. | .. | |
| 6524Q11 | Mrs. Dyer | do | 842.2 | do | 2 | .8 | .. | .. | |
| 6524Q12 | do | do | 842.1 | do | 1 | ... | .. | .. | Many feeders below |
| 6525A11 | N. F. Cole | West prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| 6525A12 | do | do | ..... | do | 1 | ... | .. | .. | |
| 6526A11 | W. L. Powell | West prong of Little Walla Walla | ..... | do | 1 | ... | .. | .. | For yield see 6522Q11 |
| 6526D11 | C. E. Anderson | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| 6527A11 | A. A. Bixby | Middle Mud Creek | 832.2 | do | Several | 10. | .. | .. | |
| 6527A12 | do | do | ..... | do | do | ... | .. | .. | |
| 6527B11 | Ben Stanton | Crystal Spring | 820.5 | do | do | [b], [a] 3.2 | June 14 | .. | |
| 6528D11 | Mary Estoupe | Middle Mud Creek | ..... | Intermediate alluvium | do | 1. | .. | .. | Rises in boggy area |
| 6528H11 | do | do | ..... | do | do | ... | .. | .. | |
| 6528J11 | Lottie McKnight | Goodman Spring Branch | ..... | Younger alluvium | 1 | .3 | .. | .. | |
| 6528K11 | Walter Von Der Abe | do | ..... | do | 2 | 1.5 | .. | .. | |
| 6528L11 | do | South Mud Creek | 813.1 | Intermediate alluvium | Several | [a] 4.2 | July 5 | .. | |
| 6529M11 | W. S. Edwards | Johnson Creek | 783.6 | do | 1 | [a] 3.9 | June 21 | .. | |
| 6529R11 | First National Bank | do | ..... | do | 1 | ... | .. | .. | |
| 6532D11 | do | Dugger Creek | ..... | Younger alluvium | 1 | ... | .. | .. | Many small feeders |
| 6532D12 | do | do | ..... | do | 1 | ... | .. | .. | do |
| 6532D13 | do | do | 776.6 | Intermediate alluvium | 1 | ... | .. | .. | |
| [illegible] | Mary Hodgen | do | ..... | do | 1 | ... | .. | .. | Dry in winter mont |
| [illegible] | ..... | ..... | 904+ | Younger alluvium | 2+ | .5 | ... | .. | do |

Record of Springs in the Walla Walla Basin, Oregon and Washington

| Owner | Name | Altitude[l] Feet above sea level | Source[o] | Maximum Number of openings | yield[m] Second-feet | Date | Temperature of | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 1933 | | |
| uchamp | South Mud Creek | ..... | Younger alluvium | 6+ | 10+ | ... | 52 | Many feeders below head |
| ller | North prong of Schwartz Spring Branch | ..... | do | Several | [n] 4.8 | June 6 | .. | |
| | South prong of Schwartz Spring Branch | 627.6 | do | do | [n] 6.8 | June 13 | 52½ | |
| all | do | 644.2 | do | do | ... | .. | .. | |
| datt | do | ..... | do | 1+ | ... | .. | 54 | |
| | | ..... | do | 1+ | ... | .. | .. | Rises in boggy area |
| | Mud Creek | ..... | do | Several | 1+ | .. | 52 | do |
| | | ..... | do | do | ... | .. | .. | |
| ve Stock and Land Co. | McEvoy Spring | 735+ | do | do | [n] 5.8 | July 5 | 58 | |
| | | ..... | Gardena terrace deposits | do | .5 | May 25 | .. | do |
| | | 732.6 | Younger alluvium | do | [n] 3.2 | June 20 | 52 | |
| man | Branch of East Mud Creek | ..... | do | 3+ | 5+ | .. | .. | |
| encken | do | ..... | do | Several | ... | .. | .. | Nearly dry in winter months |
| Markman | North Branch of So. Mud Creek | ..... | Intermediate alluvium | 1 | 2.5 | .. | .. | |
| rphy | South Mud Creek | 723.9 | Younger alluvium | Several | 3 | .. | .. | Rises in boggy area |
| rturf | Behnke Spring | 800.1 | do | 1 | .5 | .. | .. | |
| | East Mud Creek | ..... | do | 2 | 1. | .. | .. | |
| | Ford Branch | ..... | do | Several | 10. | .. | .. | Combined yield of 6522Q11 and 6526A11 |
| n | | ..... | do | 4 | .5 | .. | .. | Rises in boggy area |
| | East prong of Little Walla Walla | ..... | do | Several | [n] 1.6 | June 5 | 55½ | Combined yield of 6523L11 and 6523Q11 |
| | | ..... | Younger alluvium | Several | .5 | .. | .. | |
| er | Lewis Spring | 8[illegible]1 | do | do | [b, n] 2.4 | June 12 | .. | |
| ing | Downing Spring | 839+ | do | do | ... | .. | .. | |
| | | 841.0 | do | do | ... | .. | .. | For yield see 6523L11 |
| rp, and Jensen | | 837.7 | do | do | [n] 3.9 | June 5 | .. | |
| ? | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| rong | do | ..... | do | 1 | 1.0 | .. | .. | |
| gens | East prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| | do | ..... | do | 1 | ... | .. | .. | |
| | do | 842.2 | do | 2 | .8 | .. | .. | |
| | do | 842.1 | do | 1 | ... | .. | .. | Many feeders below source |
| | West prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| | do | ..... | do | 1 | ... | .. | .. | |
| ell | West prong of Little Walla Walla | ..... | do | 1 | ... | .. | .. | For yield see 6522Q11 |
| erson | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| | Middle Mud Creek | 832.2 | do | Several | 10. | .. | .. | |
| | do | ..... | do | do | ... | .. | .. | |
| n | Crystal Spring | 820.5 | do | do | [b, n] 3.2 | June 14 | .. | |
| upe | Middle Mud Creek | ..... | Intermediate alluvium | do | 1. | .. | .. | Rises in boggy area |
| | do | ..... | do | do | ... | .. | .. | |
| Knight | Goodman Spring Branch | ..... | Younger alluvium | 1 | .3 | .. | .. | |
| Der Ahe | do | ..... | do | 2 | 1.5 | .. | .. | |
| | South Mud Creek | 813.1 | Intermediate alluvium | Several | [m] 4.2 | July 5 | .. | |
| ards | Johnson Creek | 783.6 | do | 1 | [n] 3.9 | June 21 | .. | |
| nal Bank | do | ..... | do | 1 | ... | .. | .. | |
| | Dugger Creek | ..... | Younger alluvium | 1 | ... | .. | .. | Many small feeders below source |
| | do | ..... | do | 1 | ... | .. | .. | do |
| | do | 776.6 | Intermediate alluvium | 1 | ... | .. | .. | |
| gen | do | ..... | do | 1 | ... | .. | .. | Dry in winter months |
| | | 904± | Younger alluvium | 2+ | .5 | .. | .. | do |
| | | | do | 1 | [b, n] 1.8 | June 14 | .. | Many small feeders below source |

| | | | sea level | | | | 1933 | | |
|---|---|---|---|---|---|---|---|---|---|
| 6413Q11 | M. O. Beauchamp | South Mud Creek | ..... | Younger alluvium | 6+ | 10+ | .... | 52 | Many feeders below |
| 6423H11 | Emil Mueller | North prong of Schwartz Spring Branch | ..... | do | Several | [n] 4.8 | June 6 | .. | |
| 6423R11 | ..... | South prong of Schwartz Spring Branch | 627.6 | do | do | [n] 6.8 | June 13 | 52½ | |
| 6424P11 | Dr. Marshall | do | 644.2 | do | do | ... | .. | .. | |
| 6425B11 | J. M. Marlatt | do | ..... | do | 1+ | ... | .. | 54 | |
| 654N11 | ..... | ..... | ..... | do | 1+ | ... | .. | .. | Rises in boggy area |
| 657L11 | ..... | Mud Creek | ..... | do | Several | 1+ | .. | 52 | do |
| 6510H11 | ..... | ..... | ..... | do | do | ... | .. | .. | |
| 6510L11 | Jussand Live Stock and Land Co. | McEvoy Spring | 735+ | do | do | [n] 5.8 | July 5 | 58 | |
| 6513P11 | ..... | ..... | ..... | Gardena terrace deposits | do | .5 | May 25 | .. | do |
| 6516H11 | ..... | ..... | 732.6 | Younger alluvium | do | [n] 3.2 | June 20 | 52 | |
| 6516N11 | Fred Kralman | Branch of East Mud Creek | .. .. | do | 3+ | 5+ | .. | .. | |
| 6516P11 | John B. Rencken | do | ..... | do | Several | ... | .. | .. | Nearly dry in winter |
| 6520F11 | Herman Markman | North Branch of So. Mud Creek | ..... | Intermediate alluvium | 1 | 2.5 | .. | .. | |
| 6520J11 | Phillip Murphy | South Mud Creek | 723.9 | Younger alluvium | Several | 3 | .. | .. | Rises in boggy area |
| 6522N11 | James Overturf | Behnke Spring | 800.1 | do | 1 | .5 | .. | .. | |
| 6522P11 | J. Hansen | East Mud Creek | ..... | do | 2 | 1. | .. | .. | |
| 6522Q11 | ..... | Ford Branch | ..... | do | Several | 10. | .. | .. | Combined yield of 6526A11 |
| 6523D11 | A. T. Haun | ..... | ..... | do | 4 | .5 | .. | .. | Rises in boggy area |
| 6523L11 | ..... | East prong of Little Walla Walla | ..... | do | Several | [n] 1.6 | June 5 | 55½ | Combined yield of 6523Q11 |
| [fol. 198] | | | | | | | | | |
| 6523M11 | ..... | ..... | ..... | Younger alluvium | Several | .5 | .. | .. | |
| 6523P11 | M. M. Dyer | Lewis Spring | 834.1 | do | do | [b, n] 2.4 | June 12 | .. | |
| 6523P12 | — Downing | Downing Spring | 839+ | do | do | ... | .. | .. | |
| 6523Q11 | ..... | ..... | 841.0 | do | do | ... | .. | .. | For yield see 6523L11 |
| 6523Q12 | Hittle, Harp, and Jensen | ..... | 837.7 | do | do | [n] 3.9 | June 5 | .. | |
| 6523R11 | Livingston ? | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| 6524N11 | — Armstrong | do | ..... | do | 1 | 1.0 | .. | .. | |
| 6524P11 | W. W. Higgens | East prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| 6524P12 | do | do | ..... | do | 1 | ... | .. | .. | |
| 6524Q11 | Mrs. Dyer | do | 842.2 | do | 2 | .8 | .. | .. | |
| 6524Q12 | do | do | 842.1 | do | 1 | ... | .. | .. | Many feeders below |
| 6525A11 | N. F. Cole | West prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| 6525A12 | do | do | ..... | do | 1 | ... | .. | .. | |
| 6526A11 | W. L. Powell | West prong of Little Walla Walla | ..... | do | 1 | ... | .. | .. | For yield see 6522Q11 |
| 6526D11 | C. E. Anderson | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| 6527A11 | A. A. Bixby | Middle Mud Creek | 832.2 | do | Several | 10. | .. | .. | |
| 6527A12 | do | do | ..... | do | do | ... | .. | .. | |
| 6527B11 | Ben Stanton | Crystal Spring | 820.5 | do | do | [b, n] 3.2 | June 14 | .. | |
| 6528D11 | Mary Estoupe | Middle Mud Creek | ..... | Intermediate alluvium | do | 1. | .. | .. | Rises in boggy area |
| 6528H11 | do | do | ..... | do | do | ... | .. | .. | |
| 6528J11 | Lottie McKnight | Goodman Spring Branch | ..... | Younger alluvium | 1 | .3 | .. | .. | |
| 6528K11 | Walter Von Der Ahe | do | ..... | do | 2 | 1.5 | .. | .. | |
| 6528L11 | do | South Mud Creek | 813.1 | Intermediate alluvium | Several | [m] 4.2 | July 5 | .. | |
| 6529M11 | W. S. Edwards | Johnson Creek | 783.6 | do | 1 | [n] 3.9 | June 21 | .. | |
| 6529R11 | First National Bank | do | ..... | do | 1 | ... | .. | .. | |
| 6532D11 | do | Dugger Creek | ..... | Younger alluvium | 1 | ... | .. | .. | Many small feeders |
| 6532D12 | do | do | ..... | do | 1 | ... | .. | .. | do |
| 6532D13 | do | do | 776.6 | Intermediate alluvium | 1 | ... | .. | .. | |
| 6532G11 | Mary Hodgen | do | ..... | do | 1 | ... | .. | .. | Dry in winter months |
| 6536D11 | ..... | ..... | 904± | Younger alluvium | 2+ | .5 | .. | .. | do |
| 6619J1 | D. D. Nicholas | ..... | ..... | do | 1 | [b, n] 1.8 | June 14 | .. | Many small feeders |
| 6619N11 | Mrs. J. D. McCoy | ..... | ..... | do | Several | .8 | .. | .. | |
| 6631A11 | J. Hickman | ..... | 907± | do | do | ... | .. | .. | Dry in winter months |
| 7527M11 | D. M. Periman | Blalock Lake | ..... | do | do | ... | .. | .. | |
| 7535Q1 | — O'Farrel | ..... | ..... | do | 3 | .5 | .. | .. | |
| 7628D11 | Baker, Anderson, Leisinger | Stone Creek | ..... | do | 3 | 3 | .. | 53½ | Many small feeders |
| 7630J11 | U. S. Veterans Hospital | ..... | ..... | do | 1 | 1 | .. | .. | |

[a] By State of Oregon, Water Resources Department.
[b] By State of Washington, Department of Conservation and Development.
[l] Highest point from which water was observed to issue, May 1 to July 31, 1933, or altitude of water surface where orifice was submerged.
[m] Maximum known yield in the period 1930–1933. Unless otherwise indicated the yield is reported by W. C. Mason, assistant county watermaster, or estimated after
[n] Based on periodic measurements in 1933 by current meter or weir. (See pp. 239-256).
[o] For "younger alluvium" read young alluvium; for "intermediate alluvium" read low terrace deposits; for "Gardena terrace deposits" read high terrace deposits.

| | | Feet above sea level | | | | 1933 | | |
|---|---|---|---|---|---|---|---|---|
| Beauchamp | South Mud Creek | ..... | Younger alluvium | 6+ | 10+ | .... | 52 | Many feeders below head |
| Mueller | North prong of Schwartz Spring Branch | ..... | do | Several | [n] 4.8 | June 6 | .. | |
| ..... | South prong of Schwartz Spring Branch | 627.6 | do | do | [n] 6.8 | June 13 | 52½ | |
| Marshall | do | 644.2 | do | do | ... | .. | .. | |
| Harlatt | do | ..... | do | 1+ | ... | .. | 54 | |
| ..... | ..... | ..... | do | 1+ | ... | .. | .. | Rises in boggy area |
| ..... | Mud Creek | ..... | do | Several | 1+ | .. | 52 | do |
| ..... | ..... | ..... | do | do | ... | .. | .. | |
| Live Stock and Land Co. | McEvoy Spring | 735+ | do | do | [n] 5.8 | July 5 | 58 | |
| ..... | ..... | ..... | Gardena terrace deposits | do | .5 | May 25 | .. | do |
| ..... | ..... | 732.6 | Younger alluvium | do | [n] 3.2 | June 20 | 52 | |
| Salman | Branch of East Mud Creek | ..... | do | 3+ | 5+ | .. | .. | |
| Rencken | do | ..... | do | Several | ... | .. | .. | Nearly dry in winter months |
| Markman | North Branch of So. Mud Creek | ..... | Intermediate alluvium | 1 | 2.5 | .. | .. | |
| Murphy | South Mud Creek | 723.9 | Younger alluvium | Several | 3 | .. | .. | Rises in boggy area |
| Overturf | Behnke Spring | 800.1 | do | 1 | .5 | .. | .. | |
| ..... | East Mud Creek | ..... | do | 2 | 1. | .. | .. | |
| ..... | Ford Branch | ..... | do | Several | 10. | .. | .. | Combined yield of 6522Q11 and 6526A11 |
| Shun | ..... | ..... | do | 4 | .5 | .. | .. | Rises in boggy area |
| ..... | East prong of Little Walla Walla | ..... | do | Several | [n] 1.6 | June 5 | 55½ | Combined yield of 6523L11 and 6523Q11 |
| ..... | ..... | ..... | Younger alluvium | Several | .5 | .. | .. | |
| Dyer | Lewis Spring | 834.1 | do | do | [b, n] 2.4 | June 12 | .. | |
| Fleming | Downing Spring | 839+ | do | do | ... | .. | .. | |
| ..... | ..... | 841.0 | do | do | ... | .. | .. | For yield see 6523L11 |
| Harp, and Jensen | ..... | 837.7 | do | do | [n] 3.9 | June 5 | .. | |
| Don ? | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| Armstrong | do | ..... | do | 1 | 1.0 | .. | .. | |
| Higgens | East prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| ..... | do | ..... | do | 1 | ... | .. | .. | |
| Iler | do | 842.2 | do | 2 | .8 | .. | .. | |
| ..... | do | 842.1 | do | 1 | ... | .. | .. | Many feeders below source |
| Hale | West prong of Big Spring Branch | ..... | do | 1 | 2.5 | .. | .. | |
| ..... | do | ..... | do | 1 | ... | .. | .. | |
| Howell | West prong of Little Walla Walla | ..... | do | 1 | ... | .. | .. | For yield see 6522Q11 |
| Anderson | West prong of Big Spring Branch | ..... | do | 1 | .5 | .. | .. | |
| Irby | Middle Mud Creek | 832.2 | do | Several | 10. | .. | .. | |
| ..... | do | ..... | do | do | ... | .. | .. | |
| Hilton | Crystal Spring | 820.5 | do | do | [b, n] 3.2 | June 14 | .. | |
| Stoupe | Middle Mud Creek | ..... | Intermediate alluvium | do | 1. | .. | .. | Rises in boggy area |
| ..... | do | ..... | do | do | ... | .. | .. | |
| McKnight | Goodman Spring Branch | ..... | Younger alluvium | 1 | .3 | .. | .. | |
| Von Der Ahe | do | ..... | do | 2 | 1.5 | .. | .. | |
| ..... | South Mud Creek | 813.1 | Intermediate alluvium | Several | [m] 4.2 | July 5 | .. | |
| Edwards | Johnson Creek | 783.6 | do | 1 | [n] 3.9 | June 21 | .. | |
| National Bank | do | ..... | do | 1 | ... | .. | .. | |
| ..... | Dugger Creek | ..... | Younger alluvium | 1 | ... | .. | .. | Many small feeders below source |
| ..... | do | ..... | do | 1 | ... | .. | .. | do |
| ..... | do | 776.6 | Intermediate alluvium | 1 | ... | .. | .. | |
| Hodgen | do | ..... | do | 1 | ... | .. | .. | Dry in winter months |
| ..... | ..... | 904± | Younger alluvium | 2+ | .5 | .. | .. | do |
| Nicholas | ..... | ..... | do | 1 | [b, n] 1.8 | June 14 | .. | Many small feeders below source |
| O. McCoy | ..... | ..... | do | Several | .8 | .. | .. | |
| Man | ..... | 907± | do | do | ... | .. | .. | Dry in winter months |
| Friman | Blalock Lake | ..... | do | do | ... | .. | .. | |
| Farrel | ..... | ..... | do | 3 | .5 | .. | .. | |
| Anderson, Leisinger | Stone Creek | ..... | do | 3 | 3 | .. | 53½ | Many small feeders below source. |
| Veterans Hospital | ..... | ..... | do | 1 | 1 | .. | .. | |

Oregon, Water Resources Department.
Washington, Department of Conservation and Development.
nt from which water was observed to issue, May 1 to July 31, 1933, or altitude of water surface where orifice was submerged.
known yield in the period 1930–1933. Unless otherwise indicated the yield is reported by W. C. Mason, assistant county watermaster, or estimated after local inquiry.
eriodic measurements in 1933 by current meter or weir. (See pp. 239-256).
er alluvium" read young alluvium; for "intermediate alluvium" read low terrace deposits; for "Gardena terrace deposits" read high terrace deposits.

[fol. 199] A striking feature of the springs on and near the Milton-Freewater fan is their arrangement in three parallel zones which are concentric about the apex of the fan (Pl. 5). For convenience in description the three spring zones are designated the inner, intermediate, and outer zones. The inner zone is 3 to 3½ miles downstream from Freewater and extends from spring 6619N11, which is about half a mile east of the McCoy Bridge, to spring 6532G11, which is one of the heads of Dugger Creek. This zone comprises fully three fourths of the springs in the Walla Walla Basin and is conspicuous both on the ground and on the map (Pl. 5). The intermediate and outer spring zones are situated about 2 miles and 4 miles, respectively, beyond the inner zone. Each contains only a few springs and is not conspicuous. A number of springs issue from the alluvium of the Mill Creek fan but they are too few to indicate a systematic arrangement.

[fol. 200] Two types of spring outlets and spring channels exist. The first type is characterized by a trench-like channel 20 to 40 feet wide and 3 to 10 feet deep which is cut into the alluvial fan and which terminates sharply in a cup-shaped basin; from this constrained basin the spring issues. An example of this type is Lewis Spring Branch, No. 6523P11, which is pictured in Plate 6, A. The second type has a relatively broad channel and heads in an open amphi-

Plate 6.—A. Head of the Lewis Spring Branch, spring 6523P11; B, Head of Dugger Creek, looking across spring 6532D12 toward spring D11.

theater whose sides slope gently and whose floor covers as much as 10 acres and stands 5 to 10 feet below the surface of the fan. On the floor occur one or more spring orifices which discharge into an inner channel 2 to 3 feet deep. An example is the perennial head of Dugger Creek, which comprises springs 6523D11 and D12 and which is viewed in Plate 6, B. The cup-shaped basin is especially common among the springs of the inner zone.

(Here follows 1 photo, folio 201)

201

A, Head of the Lewis Spring Branch, spring 6523P11.

B, Head of Dugger Creek, looking across spring 6532D12 toward spring D11.

U. S. GEOLOGICAL SURVEY

Advance Data-Subject to Revision
ARTHUR M. PIPER Geologist
Released OCT 30 1933 AMP

Original data by
Compiled by
Checked by

[fol. 202] The arrangement of the orifices in distinct zones and the form of the basins and channels indicate that the springs are an integral part of the natural drainage system of the alluvial fan and that they have not come into being nor been modified materially by natural processes within historic time. This conclusion is substantiated by the statements of long-time residents, by the acceptance of the springs as trustworthy sources of water since the early settlement of the valley, and by the existence of oak trees as large as 24 inches in diameter among the water-using vegetation about some of the spring orifices. The regimen of the springs may well have been influenced in historic time by irrigation on the alluvial fans and floor plains but the springs were not created by that irrigation.

[fol. 203] Relation of Springs to the Water Table

As has been postulated on page 34, the relatively impermeable deposits of the Gardena terrace constrict the permeable young alluvium at the outer margin of the Milton-Freewater fan so that the aggregate capacity of the alluvium to transmit ground water is materially greater along the margin of the fan than in the several tongues which extend outward between the terrace remnants. This constriction acts as a barrier to impede the outward movement of water in the alluvium. Consequently, the water in the alluvium above the barrier is commonly ponded to such an extent that the water table is raised to intersect the land surface in its lowest spots. In such low spots, obviously, the spring orifices occur.

Thus, the springs of the inner zone seem to be comparable to the spillway of a reservoir, for they are supplied by overflow from the ground-water reservoir in the permeable alluvium, which is constantly replenished from above. They are the agencies which establish and maintain equilibrium between inflow and outflow of ground water across the barrier of less permeable terrace deposits at the outer margin of the fan. Consequently, the yield of the springs measures the decreased transmission capacity of the young alluvium. The springs of the intermediate and outer zones may well occur under analogous conditions though the location of some with respect to the high terrace deposits is not evident. Possibly the low terrace deposits, which are less permeable than the young alluvium, play the role of barrier and force the water table to the surface.

[fol. 204] Discharge and Fluctuation of Springs

The yield of the springs ranges from a minimum of a few gallons a minute to a maximum of about 6 cubic feet a second. The appended table of measurements of spring discharge, in the period beginning May 1, 1933, (pp. 239-256), and an accompanying diagram (fig. 5), show the dis-

Figure 5.—Discharge of typical springs of the inner zone.

charge of typical springs. It was not feasible to measure the discharge of all the springs, although the aggregate discharge of those which were not measured must have been large. Discharge by springs accounts for the greater part of the ground water which is disposed of by natural processes.

The yield of the springs fluctuates with the seasons. Figure 5 shows that the maximum yield of springs located at the south end of the inner zone lags behind that of the springs located at the east end of the zone, that is, it lags behind that of the springs closest to the river. At the south end of the zone, for example, Dugger Creek reached its maximum discharge on July 10; the maximum discharge of the west prong of Big Spring Branch had occurred on June 20, which was 20 days earlier. Measurements of depth to water show that in the vicinity of Dugger Creek the water table was high about July 10, whereas in the vicinity of the Big Spring Branch, the water table stood highest about June 20. Thus, the lag in the yield of springs at the south end of the inner zone corresponds to the lag of the water table in rising to its highest sustained level in that district. As this report is being prepared, the measurements of the discharge of typical springs have not been continued long enough to determine the character and magnitude of the fluctuations in all seasons of the year.

(Here follows 1 photo, folio 205)

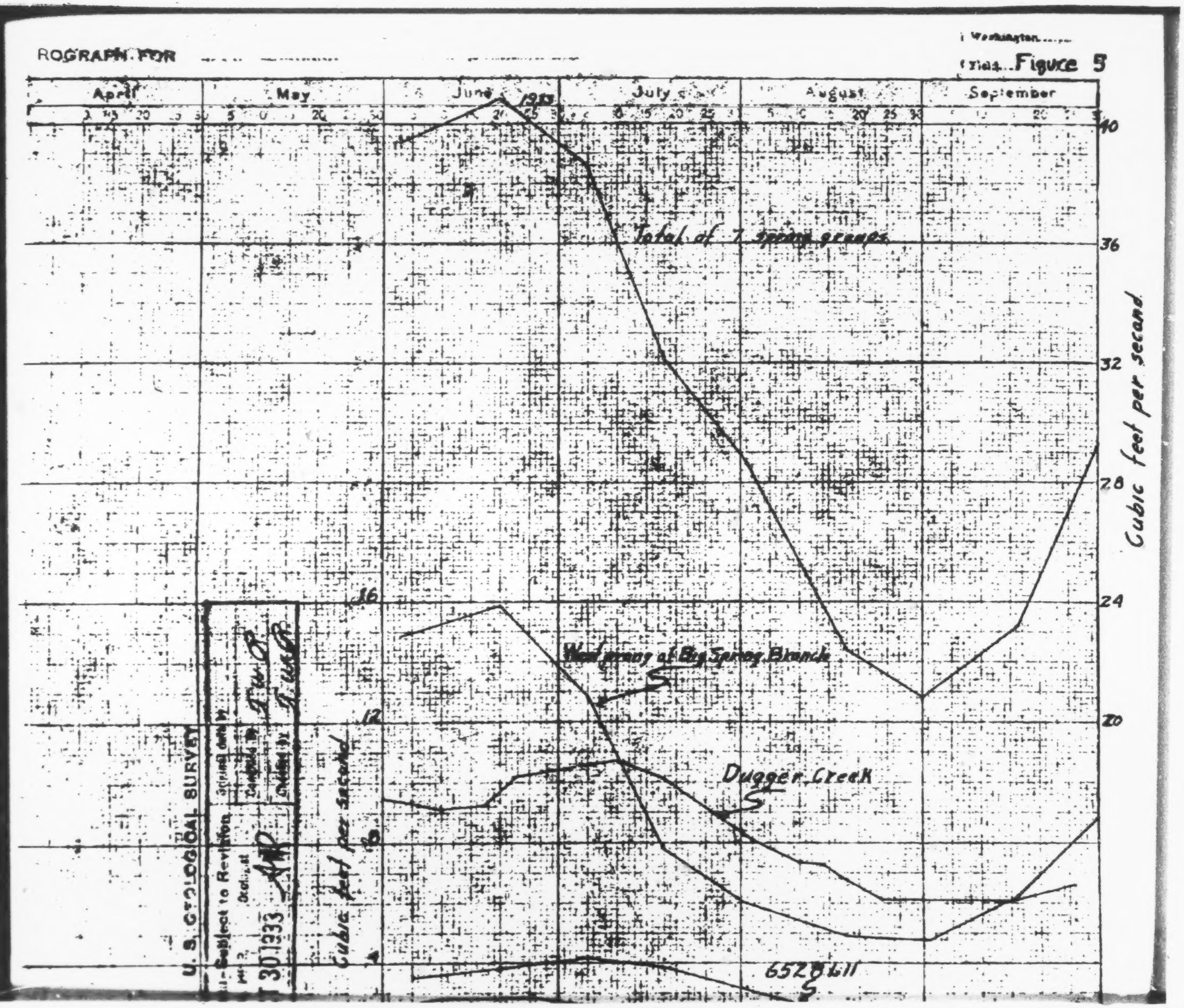
ROGRAPH FOR
Washington
Figure 5
April
May
June
July
August
September
1933
Total of 7 spring groups
West prong of Big Spring Branch
Dugger Creek
6528 Lill
Cubic feet per second
40
36
32
28
24
20
16
12
8
4
U. S. GEOLOGICAL SURVEY
Subject to Revision
30 1933

Fig. 5 - Discharge of typical springs of the inner zone

[fol. 206] The statements of long-time residents in the vicinity of the springs suggest some long-term fluctuations in the discharge of springs in the three zones. Thus, it is reported that the discharge of springs at the east end of the inner zone has decreased in the last 10 to 25 years, whereas the discharge appears to have remained roughly constant at the south end of the zone. The yield of springs in the intermediate zone appears to have remained about constant, or perhaps to have increased slightly. On the other hand, the discharge of the springs on the south prong of the Schwartz Spring Branch, at the southern end of the outer zone, is reported by D Kinney to have increased two or three-fold between 1910 and 1920 or 1925 but to have been nearly constant since that time. The presumptive explanation of the increased discharge is the contemporaneous growth of the area irrigated by surface water to the southeast, that is, higher on the alluvial fan. Whether the discharge of other springs in the outer zone has changed in similar fashion is not known.

It is probable that if the hydrologic regimen observed in the Walla Walla Basin in 1933 should be materially changed by modifications in the regulation of the river or by increased pumping for irrigation, the discharge of the springs in the inner zone would be affected.

[fol. 207] Gaining Segment of the Walla Walla River

The Walla Walla River seems to be a perennial gaining stream downstream from the McCoy bridge, which is between secs. 24 and 25, T. 6 N., R. 35 E., that is, water seeps into the stream channel from the alluvium. This condition continues downstream to and probably beyond Whitman Station, as is shown by the shape of the water-table contours for June 20 and August 29, 1933 (Pl. 5). Specifically, all the water-table contours less than 900 feet above sea level bulge upstream as they cross the river. This indicates that the water table slopes toward the stream and that ground water percolates toward the stream channel from either side. The 850-foot and 900-foot contours seem not to bulge upstream, owing perhaps to the lack of enough observation wells to control accurately the shape of the contours.

On July 29, 1933, the river channel was dry between the railroad bridge at Freewater and a point about 140 yards

upstream from the McCoy bridge, but there was a flow beneath the McCoy bridge estimated to be 0.3 second-foot. (Pl. 4, B). The flow continued to increase downstream, and was derived entirely from ground-water seepage. The McCoy bridge is situated directly on the inner zone of springs, so that the discharge of ground water in the river channel at this place is presumably induced by the constriction in the permeable young alluvium, just as the discharge of the springs is induced. Neither the contours of the water table nor field observations suggest any other gaining stream in the area.

Plate 4.—B, Channel of the Walla Walla River at McCoy bridge, in secs. 24 and 25, T. 6 N., R. 35 E., on July 29, 1933.

[fol. 208] Irrigation Pumping Plants

Pumping from wells for irrigation probably is the second largest item in the disposal of ground water. A census made jointly by the Washington Department of Conservation and Development, and by the Oregon Department of Water Resources, during the late summer of 1932, enumerated 278 irrigation wells south of the Oregon-Washington boundary. No census of wells was made north of the interstate boundary. About three fourths of these wells are located between the apex of the Milton-Freewater fan and the inner zone of springs in secs. 25, 27, and 33-35, inclusive, T. 6 N., R. 35 E. When the census was taken, the discharge of 84 of the pumping plants was measured. Among these the discharge ranged from a minimum of 0.10 cubic foot a second to a maximum of 1.25 cubic feet a second, the average being 0.40 cubic foot a second. Nearly all of the pumping plants are operated by electric motors, which range from 1 to 20 horsepower; the popular sizes are 3 and 5 horsepower. Ordinarily the pumping season is about three months long; it begins about June 15, or whenever the Pleasantview ditch is shut off from the river, and continues until about September 15. Commonly the pumping plants are operated continuously during the irrigation season.

During the field season of 1933, pumping tests were made by the writer (Robinson) on 11 irrigation wells in the Walla Walla Basin. All of these wells were equipped with direct-

connected horizontal centrifugal pumps except one well, which was equipped with a deep-well turbine pump.

[fol. 209] All of the irrigation pumping plants which were tested were on dug wells, ranging in diameter between 4 and 8 feet. Each of the centrifugal pumps is mounted on a movable platform which can be raised or lowered with a windlass as the water rises and falls in the well. The extreme range of the water level during the pumping period may be as much as 35 feet so that the pump must be lowered from time to time as the water level declines lest the suction head become uneconomically large. Because they operate more effciently if the suction lift is small, the pumps are usually set in this manner within a few feet of the water level. The majority of the pumping plants are used in an auxiliary capacity to provide water for irrigation when the supply of surface water is inadequate. All the plants are not well cared for, a condition which may account for the low mechanical efficiencies of some. The data on these tests of pumping plants are given in the following table:

[fol. 210] Measurements of Discharge and Energy Input of Pumping Plants on Wells in the Walla Walla Basin, 1933

| Well number | Owner | Date of measurement | Well | | Horsepower | Total lift plus friction head | Discharge | Energy input | Efficiency | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Diameter | | | | | | |
| | | 1933 | Feet | Feet | | Feet | Gallons a minute | Kilowatts | Per cent | |
| 6424R1 | T. A. Williams | July 11 | 30 | 4 by 6 | 2 | 22.9 | 185 | 1.74 | 46.1 | |
| 6525N2 | Jerome Hill | July 12 | 58 | 6 by 6 | 5 | 35.3 | 170 | 4.3 | 26.6 | |
| 6526B1 | F. E. McElrath | July 11 | 19 | 5 by 5 | 5 | 17.6 | 190 | 2.8 | 22.8 | |
| 6526B2 | — Boerstler | July 15 | 46 | 6 by 6 | 5 | 16.9 | 180 | 3.6 | 16.0 | Pump needs repacking; dug 28 feet, drilled 18 feet additional |
| 6527Q1 | F. G. Lamb | July 22 | 43 | 5 by 6 | 5 | 31.0 | 265 | 3.9 | 40.0 | |
| 6533J1 | Farmers Brokerage Co. | July 22 | 81 | 5.5 by 6.5 | 10 | 42.0 | 485 | 7.8 | 38.2 | Dug 50 feet, drilled 31 feet additional |
| 6533J2 | do | July 22 | 42 | 5 by 6 | 5 | 35.9 | 200 | 2.9 | 47.3 | |
| 6533M1 | Shields Fruit Co. | July 12 | 442 | 6 by 6 | 10 | 40.2 | 380 | 9.0 | 32.0 | Turbine pump; dug 52 feet, drilled 390 feet additional |
| 6534B1 | Alpha Reese | July 12 | 54 | 8 by 8 | 5 | 38.4 | 225 | 4.2 | 38.6 | |
| 6534P1 | John Irons | July 22 | 34.5 | 4 by 4 | 3 | 26.4 | 190 | 3.0 | 31.9 | |
| 6534R1 | M. Carter | July 22 | 52 | 4 by 4 | 3 | 17.5 | 85 | 1.7 | 16.4 | Motor belt connected to pump |

[fol. 211] Disposal by Other Methods

In addition to the disposal of ground water by spring discharge, by pumping from wells, and by gaining streams, ground water is also discharged by transpiration and by soil evaporation. This holds particularly in the western part of the area where extensive areas bear greasewood, salt grass, and other vegetation which derives water directly from the water table. Measurements of depth to water in wells also show that there are large areas where the water table is so close to the land surface that evaporation may take place from the soil. Thus adequate facilities for the disposal of ground water by transpiration and by soil evaporation are present; undoubtedly an appreciable amount of ground water is discharged in this manner.

(Here follow 3 photos, folios 212, 213, 214)

FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 215] WASHINGTON EXHIBIT No. 19

[Title omitted]

Walla Walla River Supplemental Hydrographic Data

[fol. 216] Excerpt From U. S. Geological Survey

Water Supply Paper 492

Summary of Hydrometric Data in Washington, 1878-1919
(Pages 314-315)

Walla Walla River Basin

Mill Creek Near Walla Walla (161)

Staff gage 500 feet below diversion dam of Walla Walla waterworks and 12 miles east of Walla Walla, in Walla Walla County.

The city of Walla Walla diverts from 21 to 32 second-feet of water above the station for public water supply. Flow is regulated occasionally when gates at intake of water-supply conduit are closed when the settling basins are cleaned.

Monthly Discharge of Mill Creek near Walla Walla

| Month | Discharge in second-feet | | | Run-off in acre-feet | Accuracy |
|---|---|---|---|---|---|
| | Maximum | Minimum | Mean | | |
| 1913 | | | | | |
| August 27-31 | 29 | 29 | 29.0 | 288 | B |
| September | 36 | 29 | 29.3 | 1,740 | B |
| The period | ... | .. | ..... | 2,000 | |
| 1913–1914 | | | | | |
| October | 124 | 29 | 47.0 | 2,890 | B |
| November | 156 | 38 | 66.0 | 3,930 | B |
| December | 73 | 36 | 43.3 | 2,660 | B |
| January | 300 | 49 | 120 | 7,380 | A |
| February | 387 | 50 | 141 | 7,830 | A |
| March | 405 | 83 | 182 | 11,200 | A |
| April | 236 | 83 | 134 | 7.970 | A |
| May | 103 | 60 | 80.4 | 4,940 | A |
| June | 73 | 40 | 50.3 | 2,990 | B |
| July | 39 | 32 | 35.5 | 2,180 | B |
| August | 33 | 32 | 32.6 | 2,000 | B |
| September | 60 | 32 | 36.4 | 2,170 | B |
| The year | 405 | 29 | 80.2 | 58,100 | |

Monthly Discharge of Mill Creek near Walla Walla—Continued

| Month | Discharge in second-feet Maximum | Minimum | Mean | Run-off in acre-feet | Accuracy |
|---|---|---|---|---|---|
| 1914–15 | | | | | |
| October | 52 | 34 | 38.0 | 2,340 | A |
| November | 134 | 35 | 50.1 | 2,980 | A |
| December | 41 | .. | 33.8 | 2,080 | B |
| January | 52 | 34 | 40.5 | 2,490 | A |
| February | 209 | 61 | 101 | 5,610 | A |
| March | 334 | 61 | 124 | 7,620 | A |
| April | 334 | 64 | 130 | 7,740 | A |
| May | 440 | 66 | 148 | 9,100 | A |
| June | 102 | 32 | 49.5 | 2,950 | A |
| July | 37 | 27 | 29.8 | 1,830 | A |
| August | 27 | 22 | 24.4 | 1,500 | A |
| September | 31 | 22 | 24.1 | 1,430 | A |
| The year | 440 | 22 | 65.9 | 47,700 | |

[fol. 217]

| | | | | | |
|---|---|---|---|---|---|
| 1915–16 | | | | | |
| October | 52 | 23 | 28.4 | 1,750 | A |
| November | 224 | 27 | 72.1 | 4,290 | A |
| December | 602 | 50 | 118 | 7,260 | A |
| January | 224 | .. | 64.8 | 3,980 | B |
| February | 440 | 46 | 201 | 11,600 | A |
| March | 732 | 92 | 315 | 19,400 | A |
| April | 266 | 146 | 197 | 11,700 | A |
| May | 240 | 117 | 168 | 10,300 | A |
| June | 122 | 66 | 98.5 | 5,860 | A |
| July | 103 | 32 | 50.9 | 3,130 | A |
| August | 37 | 27 | 30.7 | 1,890 | A |
| September | 42 | 26 | 29.1 | 1,730 | A |
| The year | 732 | 23 | 114 | 82,900 | |
| 1916–17 | | | | | |
| October | 39 | 28 | 28.9 | 1,780 | A |
| November | 98 | 29 | 38.7 | 2,300 | A |
| December | 257 | 40 | 72.6 | 4,460 | A |
| January | 223 | 39 | 81.3 | 5,000 | A |
| February | 240 | 47 | 116 | 6,440 | A |
| March | 262 | 43 | 71.4 | 4,390 | A |
| April | 1,060 | 105 | 420 | 25,000 | A |
| May | 1,090 | 230 | 495 | 30,400 | B |
| June | 346 | 106 | 213 | 12,700 | B |
| July | 106 | 36 | 61.0 | 3,750 | B |
| August | 34 | 28 | 31.3 | 1,920 | B |
| September | 51 | 28 | 30.8 | 1,830 | B |
| The year | 1,090 | 28 | 138 | 100,000 | |

Note—Maximum discharge during period of record, 1,120 second-feet at 7 a.m. May 13, 1917; minimum discharge, 21 second-feet at 6:30 p.m. Aug. 29 to Sept. 1, 1915.

[fol. 218] Copy

City of Walla Walla, February 9, 1934.

Mr. Harlow Barney, Walla Walla, Washington.

Dear Sir:

Herewith is the water consumption for the City of Walla Walla as shown by Venturi meter at reservoir, viz:

1932. June 28 to July 30—32 days—10.7808 sec. ft.—6,967,851.98 gal. 24 hours.

1933. June 27 to Aug. 3—37 days—12,005 sec. ft.—7,767,185.10 gal. 24 hours.

Yours very truly, R. F. McLean, Supt. Water Dept.

[fol. 219]

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

| Date | Head in inches | Discharge in cfs. Each weir | Total |
|---|---|---|---|
| Dec. 1 | A: 4 | 2.3 | |
| | B: 3½ | 0.4 | |
| | West ditch + 0.08 cfs. Est. | | 2.8 |
| Dec. 2 | A: 3¾ | 2.1 | |
| | B: 2¾ | 0.3 | |
| | West ditch + 0.05 cfs. Est. | | 2.5 |
| Dec. 4 | A: 2⅜ | 1.1 | |
| | B: 2 | 0.2 | |
| | West ditch + 0.04 cfs. Est. | | 1.3 |
| Dec. 5 | A: 2¼ | 1.0 | |
| | B: 1¾ | 0.1 | |
| | West ditch + 0.03 cfs. Est. | | 1.1 |
| Dec. 6 | A: 2¾ | 1.3 | |
| | B: 2¼ | 0.2 | |
| | West ditch + 0.04 cfs. Est. | | 1.5 |
| Dec. 7 | A: 2½ | 1.2 | |
| | B: 2 | 0.2 | |
| Dec. 8 | A: 2¾ | 1.3 | 1.4 |
| | B: 2¼ | 0.2 | |
| Dec. 9 | A: 2⅞ | 1.4 | 1.5 |
| | B: 2⅛ | 0.2 | |

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26—Continued

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

| Date | Head in inches | Discharge in cfs. Each weir | Total |
|---|---|---|---|
| West ditch + 0.04 cfs. Est. | | | |
| Dec. 11 | A: 5¾ | 4.0 | 1.6 |
| | B: 4¾ | 0.8 | |
| | C: 2¼ | 0.3 | |
| Dec. 12 | A: 2¼ | 1.1 | 5.1 |
| | B: 2 | 0.2 | |
| Dec. 13 | A: 2½ | 1.2 | 1.3 |
| | B: 2 | 0.2 | |
| Dec. 14 | A: 3 | 1.5 | 1.4 |
| | B: 2½ | 0.3 | |
| Dec. 15 | A: 5½ | 3.8 | 1.8 |
| | B: 4½ | 0.6 | |
| | C: 2¼ | 0.3 | |
| [fol. 220] | | | 4.7 |
| Dec. 1 | A: 4 | 2.3 | |
| | B: 3½ | 0.4 | |
| West ditch + 0.08 cfs. Est. | | | |
| Dec. 2 | A: 3¾ | 2.1 | 2.8 |
| | B: 2¾ | 0.3 | |
| West ditch + 0.05 cfs. Est. | | | |
| Dec. 4 | A: 2⅜ | 1.1 | 2.5 |
| | B: 2 | 0.2 | |
| West ditch + 0.04 cfs. Est. | | | |
| Dec. 5 | A: 2¼ | 1.0 | 1.3 |
| | B: 1¾ | 0.1 | |
| West ditch + 0.03 cfs. Est. | | | |
| Dec. 6 | A: 2¾ | 1.3 | 1.1 |
| | B: 2¼ | 0.2 | |
| West ditch + 0.04 cfs. Est. | | | |
| Dec. 7 | A: 2½ | 1.2 | 1.5 |
| | B: 2 | 0.2 | |
| Dec. 8 | A: 2¾ | 1.3 | 1.4 |
| | B: 2¼ | 0.2 | |
| Dec. 9 | A: 2⅞ | 1.4 | 1.5 |
| | B: 2⅛ | 0.2 | |

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26—Continued

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

| Date | Head in inches | Discharge in cfs. Each weir | Total |
|---|---|---|---|
| West ditch + 0.04 cfs. Est. | | | 1.6 |
| Dec. 11 | A: 5¾ | 4.0 | |
| | B: 4¾ | 0.8 | |
| | C: 2¼ | 0.3 | |
| | | | 5.1 |
| Dec. 12 | A: 2¼ | 1.1 | |
| | B: 2 | 0.2 | |
| | | | 1.3 |
| Dec. 13 | A: 2½ | 1.2 | |
| | B: 2 | 0.2 | |
| | | | 1.4 |
| Dec. 14 | A: 3 | 1.5 | |
| | B: 2½ | 0.3 | |
| | | | 1.8 |
| Dec. 15 | A: 5½ | 3.8 | |
| | B: 4½ | 0.6 | |
| | C: 2¼ | 0.3 | |
| [fol. 221] | | | 4.7 |

All Diversions from West (Main) Crockett Between Frog and ¼ Mile North of Center Line of Sect. 26

(Except West Branch West Crockett)

1933

| Date | Method | Discharge in cfs. |
|---|---|---|
| Nov. 29 | Estimated | 0.7 |
| Dec. 1 | " | 0.5 |
| " 4 | " | 0.6 |
| " 5 | " | 0.6 |
| " 6 | " | 0.5 |
| " 7 | " | 0.2 |
| " 8 | " | 1.5 |
| " 9 | " | 0.7 |
| " 11 | " | 0.8 |
| " 12 | " | 0.8 |

Diversions from West Branch of West Crockett Between Head and Center Line of Sect. 26

1933

1. in SW¼ NE¼ Sect. 35—2.15 ft. rect. weir.

| Date | Head in In. | Discharge in cfs. |
|---|---|---|
| Nov. 29 | 3 | 0.9 |
| " 30 | 3 | 0.9 |
| Dec. 1 | 2⅞ | 0.8 |
| " 2 | 3 | 0.9 |
| " 3 | ... | ... |
| " 4 | 3 | 0.9 |
| " 5 | 3⅛ | 0.9 |
| " 6 | 3⅛ | 0.9 |
| " 7 | 2¼ | 0.6 |

Diversions from West Branch of West Crockett Between Head and Center Line of Sec. 26—Continued

1933

2. All other diversions

| Date | Method | Discharge in cfs |
|---|---|---|
| Nov. 29 | Estimated | 2.0 |
| " 30 | " | 1.7 |
| Dec. 1 | " | 1.6 |
| " 4 | " | 1.7 |
| " 5 | " | 1.1 |

[fol. 222] Data from U. S. G. S.

Well 551A2, Louis Howton, renter

| | | | | |
|---|---|---|---|---|
| 1933 | Oct. | 2 | b/15.10 | 976.06 |
| | " | 9 | 15.68 | 975.48 |
| | " | 16 | b/14.64 | 976.52 |
| | " | 23 | 14.89 | 976.27 |
| | " | 30 | 14.50 | 976.66 |
| | Dec. | 4 | 15.95 | 975.21 |
| | " | 28 | 13.43 | 977.73 |

[fol. 223] Well 6525P1, U. H. Hayden, Owner Data from U. S. G. S.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1933 | | | | | | |
| Oct. | 2 | c/29.47 | 877.43 | Nov. | 25 | c/30.94 | 875.96 |
| " | 2 | b/29.58 | 877.32 | " | 26 | c/31.77 | 875.13 |
| " | 7 | c/32.01 | 874.89 | " | 28 | c/32.85 | 874.05 |
| " | 9 | 32.83 | 874.07 | " | 29 | c/33.12 | 873.78 |
| " | 11 | c/33.56 | 873.34 | Dec. | 1 | c/33.54 | 873.36 |
| " | 16 | c/33.44 | 873.46 | " | 3 | c/33.41 | 873.49 |
| " | 16 | b/33.53 | 873.37 | " | 4 | 33.39 | 873.51 |
| " | 18 | c/34.43 | 872.47 | " | 6 | c/33.11 | 873.79 |
| " | 21 | c/34.94 | 871.96 | " | 9 | c/36.16 | 870.74 |
| " | 24 | c/34.99 | 871.91 | " | 10 | c/24.89 | 882.01 |
| " | 25 | 34.93 | 871.97 | " | 11 | c/22.47 | 884.43 |
| " | 30 | 35.78 | 871.12 | " | 14 | c/18.43 | 888.47 |
| Nov. | 1 | c/35.77 | 871.13 | " | 19 | c/16.18 | 890.72 |
| " | 4 | c/25.24 | 881.66 | " | 21 | c/16.80 | 890.10 |
| " | 5 | c/21.15 | 885.75 | " | 23 | c/13.60 | 893.30 |
| " | 6 | c/18.97 | 887.93 | " | 25 | c/12.47 | 894.43 |
| " | 7 | c/18.56 | 888.34 | " | 27 | c/12.25 | 894.65 |
| " | 8 | c/18.16 | 888.74 | " | 28 | 12.14 | 894.76 |
| " | 9 | c/17.66 | 889.22 | " | 29 | c/11.98 | 894.92 |
| " | 11 | c/17.54 | 889.36 | " | 30 | c/11.68 | 895.22 |
| " | 12 | c/17.84 | 889.06 | 1934 | | | |
| " | 14 | c/17.84 | 889.06 | Jan. | 2 | c/11.14 | 895.76 |
| " | 16 | c/19.77 | 887.13 | " | 4 | 11.09 | 895.81 |
| " | 17 | c/21.04 | 885.86 | " | 4 | c/11.30 | 895.60 |
| " | 18 | c/22.42 | 884.48 | " | 9 | c/11.79 | 895.11 |
| " | 19 | c/24.34 | 882.56 | " | 13 | c/12.34 | 894.56 |
| " | 20 | c/25.61 | 881.29 | " | 16 | c/12.64 | 894.26 |
| " | 21 | c/26.72 | 880.18 | " | 18 | 13.45 | 893.45 |
| " | 22 | c/28.39 | 878.51 | | | | |
| " | 24 | c/30.01 | 876.89 | | | | |

[fol. 224] Data from U. S. G. S.

Well 6526P1, O. K. Goodman, Owner

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1933 | | | | Nov. | 14 | c/45.12 | 863.85 |
| Oct. | 1 | c/32.83 | 876.14 | " | 15 | c/45.16 | 863.81 |
| " | 2 | c/33.18 | 875.79 | " | 16 | c, l/45.2 | 863.8– |
| " | 2 | b/32.82 | 876.15 | to | | | |
| " | 3 | c/33.55 | 875.42 | Dec. | 7 | c, i/45.2 | 863.8– |
| " | 4 | c/33.36 | 875.61 | " | 4 | i/45.10 | 863.87 |
| " | 5 | c/34.40 | 874.57 | " | 8 | c/43.65 | 865.32 |
| " | 6 | c/36.12 | 872.85 | " | 9 | c/44.10 | 864.87 |
| " | 7 | c/37.30 | 871.67 | " | 10 | c/44.34 | 864.63 |
| " | 8 | c/38.47 | 870.50 | " | 11 | c/43.90 | 865.07 |
| " | 9 | 39.19 | 869.78 | " | 12 | c/43.30 | 865.67 |
| " | 9 | c/39.10 | 869.87 | " | 13 | c/42.91 | 866.06 |
| " | 10 | c/37.76 | 871.21 | " | 14 | c/42.46 | 866.51 |
| " | 11 | c/38.91 | 870.06 | " | 15 | c/41.95 | 867.02 |
| " | 12 | c/38.71 | 870.26 | " | 16 | c/41.83 | 867.14 |
| " | 13 | c/39.70 | 869.27 | " | 17 | c/42.25 | 866.72 |
| " | 14 | c/39.81 | 869.16 | " | 18 | c/42.67 | 866.30 |
| " | 15 | c/39.95 | 869.02 | " | 19 | c/42.65 | 866.32 |
| " | 16 | c/40.05 | 868.92 | " | 20 | c/42.26 | 866.71 |
| " | 16 | b/40.02 | 860.95 | " | 21 | c/41.60 | 867.37 |
| " | 17 | c/40.25 | 868.72 | " | 22 | c/40.43 | 868.54 |
| " | 18 | c/40.06 | 868.91 | " | 23 | c/39.27 | 869.70 |
| " | 19 | c/39.67 | 869.30 | " | 24 | c/37.18 | 871.79 |
| " | 20 | c/39.62 | 869.35 | " | 25 | c/39.25 | 869.72 |
| " | 21 | c/40.43 | 868.54 | " | 26 | c/40.75 | 868.22 |
| " | 22 | c/41.23 | 867.74 | " | 27 | c/41.05 | 867.92 |
| " | 23 | c/41.78 | 867.19 | " | 28 | 40.43 | 868.54 |
| " | 24 | 42.02 | 866.95 | " | 28 | c/40.37 | 868.60 |
| " | 25 | c/42.74 | 866.23 | " | 29 | c/40.10 | 868.87 |
| " | 26 | c/43.28 | 865.69 | " | 30 | c/38.90 | 870.07 |
| " | 27 | c/43.80 | 865.17 | " | 31 | c/38.23 | 870.74 |
| " | 28 | c/44.21 | 864.76 | 1934 | | | |
| " | 29 | c/44.50 | 864.47 | Jan. | 1 | c/38.22 | 870.75 |
| " | 30 | 44.50 | 864.47 | " | 2 | c/38.68 | 870.29 |
| " | 30 | c/44.44 | 864.53 | " | 3 | c/39.42 | 869.55 |
| " | 31 | c/44.47 | 864.50 | " | 4 | 39.80 | 860.17 |
| Nov. | 1 | c/44.57 | 864.40 | " | 4 | c/39.74 | 869.23 |
| " | 2 | c/44.66 | 864.31 | " | 5 | c/40.23 | 868.74 |
| " | 3 | c/44.47 | 864.50 | " | 6 | c/40.76 | 868.21 |
| " | 4 | c/43.97 | 865.00 | " | 7 | c/41.42 | 867.55 |
| " | 5 | c/43.58 | ..... | " | 8 | c/42.15 | 866.82 |
| " | 6 | c/43.62 | 865.35 | " | 9 | c/42.52 | 866.45 |
| " | 7 | c/43.80 | 865.17 | " | 10 | c/42.80 | 866.17 |
| " | 8 | c/44.00 | 864.97 | " | 11 | c/42.67 | 866.30 |
| " | 9 | c/44.13 | 864.84 | " | 12 | c/42.22 | 866.75 |
| " | 10 | c/44.28 | 864.69 | " | 13 | c/42.16 | 866.81 |
| " | 11 | c/44.47 | 864.50 | " | 14 | c/42.38 | 866.59 |
| " | 12 | c/44.70 | 864.27 | " | 15 | c/42.55 | 866.42 |
| " | 13 | c/44.91 | 864.06 | " | 16 | c/42.74 | 866.23 |
| | | | | " | 17 | c/42.95 | 866.02 |
| | | | | " | 18 | c/43.05 | 865.92 |

[fol. 225] Data from U. S. G. S.

Well 6536H1, Walter Herman, Owner

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1933 | | | | | | | |
| Oct. | 1 | c, h/26.88 | 904.87 | Nov. | 21 | c/24.51 | 907.24 |
| " | 2 | b, h/27.40 | 904.35 | " | 25 | c/26.96 | 904.79 |
| " | 2 | c, h/27.43 | 904.32 | " | 26 | c/27.62 | 904.13 |
| " | 3 | c, h/27.69 | 904.06 | " | 28 | c/28.77 | 902.98 |
| " | 4 | c, h/28.00 | 903.75 | Dec. | 1 | c/30.36 | 901.39 |
| " | 5 | c, h/28.23 | 903.52 | " | 2 | c/30.82 | 900.93 |
| " | 7 | c, h/27.93 | 903.82 | " | 3 | c/31.26 | 900.49 |
| " | 9 | c, h/27.69 | 904.06 | " | 4 | 31.64 | 900.11 |
| " | 9 | h/27.69 | 904.06 | " | 4 | c/31.68 | 900.07 |
| " | 11 | c, h/27.35 | 904.40 | " | 5 | c/31.95 | 899.80 |
| " | 13 | c, h/26.34 | 904.91 | " | 6 | c/32.21 | 899.54 |
| " | 14 | c, h/26.71 | 905.04 | " | 7 | c/32.45 | 899.30 |
| " | 16 | b, h/26.11 | 905.64 | " | 8 | c/32.52 | 899.23 |
| " | 17 | c, h/26.40 | 905.35 | " | 9 | c/32.50 | 899.25 |
| " | 19 | c, h/26.12 | 905.63 | " | 10 | c/32.15 | 899.60 |
| " | 20 | c, h/26.02 | 905.73 | " | 13 | c/29.47 | 902.28 |
| " | 21 | c, h/25.95 | 905.80 | " | 14 | c/28.87 | 902.88 |
| " | 22 | c, h/25.69 | 906.06 | " | 16 | c/27.56 | 904.19 |
| " | 24 | c, h/24.92 | 906.83 | " | 19 | c/24.83 | 906.92 |
| " | 24 | 24.81 | 906.94 | " | 20 | c/24.49 | 907.26 |
| " | 25 | c/24.28 | 907.47 | " | 22 | c/23.74 | 908.01 |
| " | 26 | c/23.82 | 907.93 | " | 23 | c/23.30 | 908.45 |
| " | 29 | c/21.55 | 910.20 | " | 25 | c/21.55 | 910.20 |
| " | 30 | 21.22 | 910.53 | " | 28 | c/18.92 | 912.83 |
| " | 30 | c/21.16 | 910.59 | " | 29 | c/18.06 | 913.69 |
| Nov. | 2 | c/20.84 | 910.91 | " | 29 | 17.94 | 913.81 |
| " | 3 | c/20.91 | 910.84 | 1934 | | | |
| " | 4 | c/21.28 | 910.47 | Jan. | 1 | c/15.61 | 916.14 |
| " | 5 | c/21.28 | 910.47 | " | 4 | 14.19 | 917.56 |
| " | 6 | c/20.99 | 910.76 | " | 5 | c/13.24 | 917.51 |
| " | 7 | c/20.57 | 911.18 | " | 8 | c/13.43 | 918.32 |
| " | 9 | c/19.93 | 911.82 | " | 9 | c/13.32 | 918.43 |
| " | 10 | c/19.73 | 912.02 | " | 10 | c/13.25 | 918.50 |
| " | 12 | c/19.73 | 912.02 | " | 12 | c/13.33 | 918.42 |
| " | 14 | c/20.10 | 911.65 | " | 13 | c/13.35 | 918.40 |
| " | 15 | c/20.69 | 911.06 | " | 15 | c/13.37 | 918.38 |
| " | 16 | c/21.10 | 910.65 | " | 18 | 13.45 | 918.30 |
| " | 17 | c/21.58 | 910.17 | | | | |
| " | 18 | c/22.27 | 909.48 | | | | |
| " | 20 | c/23.89 | 907.86 | | | | |

[fol. 226] WASHINGTON EXHIBIT No. 20

[Title omitted]

Tabulation (by Sections) of the Estimated Acreages of the Related Lands in the State of Washington Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to Location of Said Acreages in Sections, Townships and Ranges

[fol. 227]

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-6-33 | 20.00 | 15.00 | | | | | | | 5.00 | | |
| 3-6-33 | 60.00 | | | 60.00 | | | | | | | |
| 4-6-33 | 353.00 | | | 53.00 | 300.00 | | | | | | |
| 5-6-33 | 196.00 | 60.00 | | 106.00 | 30.00 | | | | | | |
| 6-6-33 | 141.00 | | | 91.00 | 50.00 | | | | | | |
| 7-6-33 | 120.00 | | | 60.00 | 60.00 | | | | | | |
| 8-6-33 | 360.00 | 100.00 | | 140.00 | 120.00 | | | | | | |
| 9-6-33 | 499.00 | | | 369.00 | 130.00 | | | | | | |
| 10-6-33 | 620.00 | | 20.00 | 490.00 | 90.00 | | | | 20.00 | | |
| 11-6-33 | 534.00 | | | 267.00 | 267.00 | | | | | | |
| 12-6-33 | 330.00 | | | 20.00 | 310.00 | | | | | | |
| 13-6-33 | 556.00 | 90.00 | | 156.00 | 310.00 | | | | | | |
| 14-6-33 | 364.00 | | | 160.00 | 204.00 | | | | | | |
| 15-6-33 | 378.00 | | | 238.00 | 140.00 | | | | | | |
| 16-6-33 | 207.00 | | | 37.00 | 170.00 | | | | | | |
| 17-6-33 | 20.00 | | | 20.00 | | | | | | | |
| [fol. 228] | | | | | | | | | | | |
| 25-7-33 | 160.00 | 80.00 | | | | | | | 80.00 | | |
| 34-7-33 | 160.00 | 80.00 | | | | | | | 30.00 | 50.00 | |
| 35-7-33 | 120.00 | 40.00 | | | | | | | 10.00 | 70.00 | |
| 36-7-33 | 50.00 | | | 50.00 | | | | | | | |
| 3-6-34 | 145.00 | | | 145.00 | | | | | | | |
| 4-6-34 | 484.00 | | | 391.00 | | | | | 93.00 | | |
| 5-6-34 | 276.00 | 10.00 | | 189.00 | | | | | 77.00 | | |
| 6-6-34 | 276.00 | | | 276.00 | | | | | | | |
| 7-6-34 | 48.00 | | | 48.00 | | | | | | | |
| 9-6-34 | 350.00 | | | 350.00 | | | | | | | |
| 10-6-34 | 187.00 | | | 187.00 | | | | | | | |
| 11-6-34 | 284.00 | | | 284.00 | | | | | | | |
| 12-6-34 | 50.00 | | | 50.00 | | | | | | | |
| 14-6-34 | 86.00 | | | 86.00 | | | | | | | |
| 15-6-34 | 60.00 | | | 60.00 | | | | | | | |
| 18-6-34 | 132.00 | | | 132.00 | | | | | | | |

[fol. 229]

Washington by Sections—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19–7–34 | 85.00 | 15.00 | | | | | | | 70.00 | | |
| 25–7–34 | 50.00 | 10.00 | 2.00 | 30.00 | | | | 8.00 | | | |
| 26–7–34 | 30.00 | | | 30.00 | | | | | | | |
| 27–7–34 | 254.00 | 120.00 | | | | | | | 134.00 | | |
| 29–7–34 | 272.11 | 100.00 | | | | | | | 172.11 | | |
| 30–7–34 | 396.00 | 60.00 | 20.00 | 40.00 | | | | | 276.00 | | |
| 31–7–34 | 155.00 | 30.00 | 8.00 | 50.00 | | | | | 67.00 | | |
| 32–7–34 | 298.00 | 36.00 | 5.00 | | | | | | 257.00 | | |
| 29–30–31–32–7–34 | 284.00 | | | | | | | | 284.00 | | |
| 33–7–34 | 279.96 | | | | | | | | 279.96 | | |
| 34–7–34 | 240.00 | 10.00 | 60.00 | | | 10.00 | | | 160.00 | | |
| 35–7–34 | 210.00 | 50.00 | 55.00 | | | | | | 105.00 | | |
| 36–7–34 | 344.00 | 124.00 | 37.00 | | | 7.00 | 14.00 | | 162.00 | | |
| 35 & 36–7–34 | 25.00 | | 20.00 | | | | | | | 5.00 | |
| [fol. 230] | | | | | | | | | | | |
| 1–6–35 | 175.00 | 91.00 | 24.00 | 60.00 | | | | | | | |
| 2–6–35 | 174.25 | 44.25 | 10.00 | 10.00 | | 10.00 | | | 100.00 | | |
| 32 & 2–6–35 | 18.00 | 18.00 | | | | | | | | | |
| 3–6–35 | 129.00 | 90.00 | 14.00 | 9.00 | | | 10.00 | | 6.00 | | |
| 4–6–35 | 361.00 | 72.00 | 116.00 | | | 60.00 | | | 113.00 | | |
| 5–6–35 | 239.10 | 92.50 | 81.60 | | | | | | 50.00 | 15.00 | |
| 6–6–35 | 20.00 | 12.00 | | | | | | | 8.00 | | |
| 8–6–35 | 8.00 | | | | | | | | 8.00 | | |
| 9–6–35 | 410.00 | 61.15 | 88.00 | | | 20.00 | 38.25 | 51.60 | 151.00 | | |
| 10–6–35 | 107.50 | 22.00 | 30.00 | | | 18.00 | | | 37.50 | | |
| 3, 4, 9 & 10–6–35 | 15.00 | | 15.00 | | | | | | | | |
| 3 & 10–6–35 | 160.80 | 20.00 | 10.00 | | | 85.80 | 5.00 | 9.00 | 31.00 | | |
| 11–6–35 | 316.35 | 61.00 | 10.00 | 20.00 | | | | | 216.35 | | |
| 12–6–35 | 171.00 | 80.00 | 20.00 | 10.00 | | 20.00 | | | 41.00 | | |
| 13–6–35 | 25.00 | | 15.00 | 10.00 | | | | | | | |
| 14–6–35 | 122.69 | 93.69 | | | | | | | 29.00 | | |

Continued.

[fol. 231]

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15-6-35 | 100.50 | 20.00 | 21.00 | 29.50 | | | | 30.00 |
| 16-6-35 | 85.00 | 10.00 | 5.00 | | | | | 70.00 |
| 18-6-35 | 68.00 | | | 50.00 | | 18.00 | | |
| 22-7-35 | 0.50 | | | | | | 0.50 | |
| 23-7-35 | 29.61 | 29.61 | | | | | | |
| 24-7-35 | 250.58 | 158.00 | | | 20.00 | 10.00 | 62.58 | |
| 25-7-35 | 369.66 | 369.66 | | | | | | |
| 26-7-35 | 454.53 | 374.44 | | | 80.09 | | | |
| 27-7-35 | 309.00 | 72.00 | 35.00 | | | | 10.00 | 192.00 |
| 28-7-35 | 205.66 | 125.44 | 59.00 | | 5.00 | 6.22 | | 10.00 |
| 29-7-35 | 118.00 | 88.00 | | | | | 30.00 | |
| 31-7-35 | 132.00 | 25.00 | 25.00 | | | | 10.00 | 72.00 |
| 32-7-35 | 93.00 | 15.00 | 23.00 | | | | | 55.00 |
| 32 & 33-7-35 | 37.00 | 15.00 | 7.00 | | | | | 15.00 |
| 33-7-35 | 119.70 | 104.70 | 10.00 | 5.00 | | | | |
| 35-7-35 | 68.00 | 44.00 | 22.00 | | 2.00 | | | |
| 36-7-35 | 40.50 | 23.25 | | | 17.25 | | | |

[fol. 232]

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5-6-36 | 82.50 | 74.00 | 8.50 | | | | | |
| 6-6-36 | 296.79 | 260.79 | 4.00 | 32.00 | | | | |
| 8-6-36 | 54.00 | 54.00 | | | | | | |
| 2-7-36 | 7.00 | | 7.00 | | | | | |
| 6-7-36 | 7.50 | | | 7.50 | | | | |
| 13-7-36 | 148.70 | | | | 11.50 | | 137.20 | |
| 14-7-36 | 150.00 | 20.00 | | | 20.00 | 35.00 | 75.00 | |
| 15-7-36 | 8.00 | | | 8.00 | | | | |
| 19-7-36 | 17.75 | | | | | 7.75 | 10.00 | |
| 20-7-36 | 20.50 | 20.50 | | | | | | |
| 21-7-36 | 41.45 | | | | 20.00 | | 21.45 | |
| 22-7-36 | 273.14 | 8.00 | | | | 1.00 | 264.14 | |
| 23-7-36 | 161.27 | | | | 7.50 | 27.90 | 125.87 | |
| 27-7-36 | 117.01 | 69.78 | | | | 26.46 | 20.77 | |
| 28-7-36 | 67.79 | 34.98 | 15.38 | | 7.03 | 2.50 | 7.90 | |

Continued

[fol. 233] Washington by Sections—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29-7-36 | 70.25 | 2.35 | | | | | 10.00 | 57.90 | | | |
| 30-7-36 | 97.31 | | | | | 33.13 | | 64.18 | | | |
| 31-7-36 | 30.20 | | | 30.20 | | | | | | | |
| 32-7-36 | 38.65 | 7.40 | | 1.50 | | 11.00 | 18.75 | | | | |
| 5-6-37 } 32-7-36 } | 95.75 | 95.75 | | | | | | | | | |
| 33-7-36 | 198.98 | 103.14 | 15.00 | 70.84 | | | | 10.00 | | | |
| 34-7-36 | 24.00 | 8.00 | | 16.00 | | | | | | | |
| 35-7-36 | 80.00 | 60.00 | | | | 20.00 | | | | | |
| 1-6-37 | 23.00 | | | | | 20.00 | | 3.00 | | | |
| 2-6-37 | 17.00 | | | | | 12.00 | | 5.00 | | | |
| 15-7-37 | 18.00 | 8.00 | | | | | 10.00 | | | | |
| 16-7-37 | 42.00 | 10.50 | | | | | | 31.50 | | | |
| 17-7-37 | 125.10 | 39.00 | | | | 51.10 | 35.00 | | | | |
| 18-7-37 | 48.70 | | | | | 19.00 | 4.80 | 24.90 | | | |

Continued

[fol. 234] Doan Creek by Sections

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 32-7-35 | 54.50 | 29.00 | 17.50 | | | 8.00 | | | | | |
| 33-7-35 | 125.00 | 92.00 | 10.00 | | | 8.00 | | | 15.00 | | |
| 34-7-35 | 124.00 | 80.00 | 14.00 | | | | | | 30.00 | | |
| 35-7-35 | 20.00 | 20.00 | | | | | | | | | |

[fol. 235] Stone Creek by Sections

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-6-35 | 40.00 | 40.00 | | | | | | | | | |
| 2-6-35 | 133.00 | 52.00 | 28.00 | | | 12.00 | | | 41.00 | | |
| 3-6-35 | 70.42 | 40.00 | 5.00 | | | 17.22 | | | 8.20 | | |
| 31-7-35 | 47.20 | 22.20 | 10.00 | | | 15.00 | | | | | |
| 36-7-35 | 10.00 | 10.00 | | | | | | | | | |
| 1-6-36 | 4.50 | 4.50 | | | | | | | | | |
| 28-7-36 | 87.53 | 59.12 | | | | 20.41 | | 8.00 | | | |
| 29-7-36 | 5.00 | 5.00 | | | | | | | | | |
| 32-7-36 | 47.81 | | | | | | 10.00 | | 37.81 | | |
| 31 & 32-7-36 | 162.00 | | | | | | 82.00 | 80.00 | | | |

[fol. 236]

Washington Permits by Sections

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 33–7–34 | 15.00 | | | | | | | | 15.00 | | |
| 11–6–35 | 14.30 | 6.00 | | | | | | | 8.30 | | |
| 28–7–36 | 3.60 | | | | | 3.60 | | | | | |
| 32–7–36 | 5.00 | 5.00 | | | | | | | | | |
| 33–7–36 | 7.50 | | | 7.50 | | | | | | | |

[fol. 237] WASHINGTON EXHIBIT No. 21

[Title omitted]

Tabulation (by Sections) of the Estimated Acreages of the Related Lands in the State of Oregon Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to Location of Said Acreages in Sections, Townships and Ranges

[fol. 238]

Oregon by Sections

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13-6-34 | 227.91 | | | 227.91 | | | | | | | |
| 14-6-34 | 12.00 | 12.00 | | | | | | | | | |
| 21-6-34 | 114.30 | | | | | 25.00 | 23.00 | 5.00 | 61.30 | | |
| 23-6-34 | 62.00 | | | 52.00 | | | | | 10.00 | | |
| 24-6-34 | 429.00 | | | 214.00 | | | | | 215.00 | | |
| 26-6-34 | 20.00 | | | | | | | | 20.00 | | |
| 27-6-34 | 135.00 | | | 135.00 | | | | | | | |
| 28-6-34 | 59.00 | 6.00 | | 53.00 | | | | | | | |
| Non-Sectionised Acres Permits | | | | | | | | | | | |
| Unclassified | 65.50 | | | | | | | | | | |
| Classified | 45.00 | 30.00 | 19.00 | | | | 5.00 | 10.00 | | | |

[fol. 239]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-5-35 | 216.84 | | | 89.00 | | | 13.82 | 114.02 | | | |
| 2-5-35 | 285.42 | | | | | | 51.86 | 233.56 | | | |
| 3-5-35 | 294.65 | 28.70 | | | | 19.00 | 159.35 | 87.60 | | | |
| 4-5-35 | 26.30 | | | 12.32 | | 13.98 | | | | | |
| 5-5-35 | 8.40 | 8.40 | | | | | | | | | |
| 12-5-35 | 168.18 | | | 12.00 | | | 121.57 | 34.61 | | | |
| 13-5-35 | 16.91 | | 1.13 | | | | 10.78 | 5.00 | | | |

[fol. 240]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13-6-35 | 310.22 | 13.22 | 35.00 | 220.00 | | | | | 42.00 | | |
| 14-6-35 | 376.15 | 26.00 | 123.18 | 2.00 | | | | 29.90 | 195.07 | | |
| 15-6-35 | 394.45 | 126.60 | 5.00 | | | | 68.00 | 194.85 | | | |
| 16-6-35 | 69.00 | 30.00 | 19.00 | | | | | | 20.00 | | |
| 17-6-35 | 184.67 | 13.00 | | 171.67 | | | | | | | |
| 18-6-35 | 366.06 | 41.00 | | 275.06 | | | | | 50.00 | | |
| 19-6-35 | 226.50 | | | 171.50 | | | 40.00 | | 15.00 | | |
| 20-6-35 | 349.00 | 110.00 | | 219.00 | | | | | 20.00 | | |
| 21-6-35 | 254.50 | 40.00 | | 49.50 | | 20.00 | 76.00 | 34.00 | 35.00 | | |
| 22-6-35 | 186.29 | 48.79 | 29.00 | | | 20.00 | 60.00 | 18.50 | 10.00 | | |

Oregon by Sections—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23-6-35 | 297.19 | | 159.69 | 9.50 | | | 19.20 | | 108.80 | | |
| 24-6-35 | 173.80 | | 88.80 | 85.00 | | | | | | | |
| 25-6-35 | 134.10 | 38.55 | 15.00 | | | | 25.00 | 55.55 | | | |
| 26-6-35 | 484.11 | 108.50 | 27.00 | | | | 52.96 | 295.65 | | | |
| 27-6-35 | 486.74 | 151.53 | 20.00 | 20.00 | | | 25.00 | 139.71 | 130.50 | | |
| 28-6-35 | 288.60 | | 165.00 | 52.60 | | | | 33.00 | 38.00 | | |
| 29-6-35 | 107.30 | 45.00 | | | | | 7.30 | 10.00 | 45.00 | | |
| 30-6-35 | 18.97 | 18.97 | | | | | | | | | |
| 32-6-35 | 221.70 | 10.00 | | 191.70 | | 10.00 | 10.00 | | | | |
| 33-6-35 | 308.10 | | 34.70 | 14.00 | | | 122.40 | 127.00 | 10.00 | | |
| 33-6-35 | 331.50 | | | | | | | | | | |
| 34-6-35 | 581.83 | 18.08 | | | | | | 563.75 | | | |
| 35-6-35 | 593.58 | | | | | | 21.68 | 571.90 | | | |
| 36-6-35 | 473.33 | 12.58 | | 105.00 | | | 11.00 | 344.75 | | | |
| [fol. 241] | | | | | | | | | | | |
| 1-5-36 | 21.53 | | | 13.83 | | | | 7.70 | | | |
| 2-5-36 | 26.80 | | | | | | | 26.80 | | | |
| 7-5-36 | 11.74 | 8.74 | | | | | | 3.00 | | | |
| 17-5-36 | 9.90 | | | | | 4.14 | 3.90 | 1.86 | | | |
| 18-5-36 | 122.58 | | | | | 17.30 | 55.70 | 49.58 | | | |
| 19-5-36 | 2.60 | | | | | 2.60 | | | | | |
| 20-5-36 | 125.24 | | 2.40 | | | 10.00 | 74.10 | 38.74 | | | |
| 21-5-36 | 167.30 | 27.90 | 44.00 | | | 13.00 | 48.70 | 33.70 | | | |
| 22-5-36 | 146.70 | 39.15 | 3.25 | | | 5.00 | 45.30 | 54.00 | | | |
| 23-5-36 | 64.73 | | 2.20 | | | | 5.20 | 57.33 | | | |
| 24-5-36 | 38.00 | | | | | 2.50 | 35.50 | | | | |
| 25-5-36 | 82.37 | | | | | 13.00 | 3.00 | 36.37 | | | |
| 26-5-36 | 42.07 | | | | | 3.00 | 6.80 | 32.27 | | | |
| 27-5-36 | 2.20 | | | | | | | 2.20 | | | |
| 28-5-36 | 5.00 | | | | | | | 5.00 | | | |
| 30-5-36 | 76.80 | 36.80 | | | | | | 40.00 | | | |
| 31-5-36 | 59.80 | 17.60 | | | | | | 42.20 | | | |
| 36-5-36 | 14.33 | | | | | | | 14.33 | | | |

[fol. 242]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 13-6-36 | 0.50 | | 0.50 | | | | |
| 14-6-36 | 3.00 | 3.00 | | | | | |
| 18-6-36 | 21.60 | 11.60 | | 10.00 | | | |
| 22-6-36 | 2.10 | 2.10 | | | | | |
| 24-6-36 | 4.00 | | 4.00 | | | | |
| 26-6-36 | 13.00 | | | | | 10.00 | 3.00 |
| 27-6-36 | 0.50 | 0.50 | | | | | |
| 30-6-36 | 6.50 | | | | 6.50 | | |
| 31-6-36 | 1.50 | 1.50 | | | | | |

[fol. 243]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4-4-36 | 13.90 | | | | | 10.00 | 3.90 |
| 5-4-36 | 16.90 | | | 5.00 | 11.90 | | |
| 6-4-36 | 11.30 | 3.30 | | 8.00 | | | |
| 4-4-37 | 8.70 | | | | | | 8.70 |
| 5-4-37 | 21.43 | | | | 13.29 | 8.14 | |
| 9-4-37 | 10.10 | | | | | | 10.10 |
| 10-4-37 | 10.50 | | | | 10.50 | | |
| 19-5-37 | 17.10 | | | | | | 17.10 |
| 28-5-37 | 5.10 | | | | | | 5.10 |
| 29-5-37 | 15.10 | | | | | | 15.10 |
| 30-5-37 | 6.40 | | | | | 6.40 | |
| 31-5-37 | 49.80 | | | | 23.19 | 26.61 | |

[fol. 244] WASHINGTON EXHIBIT No. 22

[Title omitted]

Tabulation (by Priorities) of the Estimated Acreages of the Related Lands in the State of Washington Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to the Respective Priorities and Approximate Acreages Set Out in Stipulation No. 3 of November 10, 1933

[fol. 245]

Washington

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1859 | | | | | | |
| 32-7-36 | 37.15 | 7.40 | | | | 11.00 | 18.75 | | | | |
| | 37.15 | 7.40 | | | | 11.00 | 18.75 | | | | |
| | | | | | 1861 | | | | | | |
| 13-7-36 | 73.50 | | | | | | | 73.50 | | | |
| 14-7-36 | 150.00 | 20.00 | | | | 20.00 | 35.00 | 75.00 | | | |
| 23-7-36 | 67.50 | | | | | 7.50 | 10.00 | 50.00 | | | |
| 3-6-35 | 23.00 | 9.00 | 4.00 | | | | 10.00 | | | | |
| | 314.00 | 29.00 | 4.00 | | | 27.50 | 55.00 | 198.50 | | | |
| | | | | | 1863 | | | | | | |
| 13-7-36 | 53.70 | | | | | | | 53.70 | | | |
| 18-7-37 | 29.80 | | | | | 5.00 | 4.80 | 20.00 | | | |
| | 83.50 | | | | | 5.00 | 4.80 | 73.70 | | | |
| | | | | | 1864 | | | | | | |
| 22-7-36 | 28.00 | | | | | | | 28.00 | | | |
| 27-7-36 | 6.77 | | | | | | | 6.77 | | | |
| 6-6-36 | 3.74 | 3.74 | | | | | | | | | |
| 5-6-36 | 68.00 | 68.00 | | | | | | | | | |
| 6-6-36 | 47.00 | 47.00 | | | | | | | | | |
| | 153.51 | 118.74 | | | | | | 34.77 | | | |
| [fol. 246] | | | | | 1865 | | | | | | |
| 22-7-36 | 65.20 | | | | | | | 65.20 | | | |
| 27-7-36 | 59.03 | 59.03 | | | | | | | | | |
| | 124.23 | 59.03 | | | | | | 65.20 | | | |
| | | | | | 1866 | | | | | | |
| 30-7-36 | 83.13 | | | | | 33.13 | | 50.00 | | | |
| 8-6-36 | 54.00 | 54.00 | | | | | | | | | |
| | 137.13 | 54.00 | | | | 33.13 | | 50.00 | | | |

Washington—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1868 | | | | | | |
| 18-7-37 | 9.90 | | | | | 5.00 | | 4.90 | | | |
| 35-7-36 | 80.00 | 60.00 | | | | 20.00 | | | | | |
| | 89.90 | 60.00 | | | | 25.00 | | 4.90 | | | |
| | | | | | 1869 | | | | | | |
| 21-7-36 | 19.95 | | | | | | | 19.95 | | | |
| 18-7-37 | 9.00 | | | | | 9.00 | | | | | |
| 27-7-36 | 16.50 | | | | | | 8.50 | 8.00 | | | |
| | 45.45 | | | | | 9.00 | 8.50 | 27.95 | | | |
| | | | | | 1870 | | | | | | |
| 29-7-36 | 60.33 | | | | | | 10.00 | 50.33 | | | |
| 24-7-35 | 5.50 | 2.00 | | | | | | 3.50 | | | |
| 20-7-36 | 20.00 | 20.00 | | | | | | | | | |
| 29-7-34 | 110.00 | 30.00 | | | | | | | 80.00 | | |
| 30-7-34 | 50.00 | | | 20.00 | | | | | 30.00 | | |
| | 245.83 | 52.00 | | 20.00 | | | 10.00 | 53.83 | 110.00 | | |
| [fol. 247] | | | | | 1871 | | | | | | |
| 5-6-35 | 35.00 | | 35.00 | | | | | | | | |
| | 35.00 | | 35.00 | | | | | | | | |
| | | | | | 1872 | | | | | | |
| 23-7-36 | 10.00 | | | | | | 10.00 | | | | |
| 35-7-35 | 25.00 | 25.00 | | | | | | | | | |
| 4-6-35 | 35.00 | 30.00 | 5.00 | | | | | | | | |
| 27-7-36 | 9.75 | 9.75 | | | | | | | | | |
| | 79.75 | 64.75 | 5.00 | | | | 10.00 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15-7-37 | 10.00 | | | 1873 | | |
| 22-7-37 | 3.00 | | | | 10.00 | |
| | 13.00 | | | | 3.00 | |
| | | | | | 13.00 | |
| 35-7-37 | 5.00 | | | 1875 | | |
| 26-7-37 | 7.50 | | | | | 5.00 |
| 23-7-36 | 7.90 | | | | 7.50 | |
| | 20.40 | | | | 7.90 | |
| | | | | | 15.40 | 5.00 |
| 29-7-36 | 1.32 | | | 1876 | | |
| | 1.32 | | | | | 1.32 |
| | | | | | | 1.32 |
| 19-7-38 | 4.00 | | | 1877 | | |
| 15-7-36 | 8.00 | | 8.00 | | 4.00 | |
| | 12.00 | | 8.00 | | 4.00 | |
| [fol. 248] | | | | 1878 | | |
| 22-7-36 | 35.00 | 8.00 | | | | 27.00 |
| 23-7-36 | 6.37 | | | | | 6.37 |
| 6-6-36 | 13.40 | 13.40 | | | | |
| | 54.77 | 21.40 | | | | 33.37 |
| | | | | 1880 | | |
| 30-7-38 | 3.00 | | | | | 3.00 |
| 22-7-36 | 22.20 | | | | | 22.20 |
| | 25.20 | | | | | 25.20 |
| | | | | 1881 | | |
| 1-6-37 | 3.00 | | | | | 3.00 |
| 7-6-38 | 3.00 | | | | | 3.00 |
| 29-7-36 | 5.50 | | | | | 5.50 |
| 3-6-35 | 40.00 | 30.00 | 10.00 | | | |
| | 51.50 | 30.00 | 10.00 | | | 11.50 |

Washington—Continued

| Section | Acres | 1 | 1D | 1R° | 1RA | 2A | °2B° | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1882 | | | | | | |
| 26-7-35 | 15.00 | | | | | 15.00 | | | | | |
| 27-7-35 | 50.00 | 20.00 | 10.00 | | | | | 10.00 | 10.00 | | |
| 16-6-35 | 5.00 | 5.00 | | | | | | | | | |
| 15-6-35 | 21.00 | | 21.00 | | | | | | | | |
| | 91.00 | 25.00 | 31.00 | | | 15.00 | | 10.00 | 10.00 | | |
| [fol. 249] | | | | | 1883 | | | | | | |
| 23-7-36 | 20.50 | | | | | | | 20.50 | | | |
| 27-7-36 | 6.00 | | | | | | | 6.00 | | | |
| 22-7-36 | 16.00 | | | | | | 1.00 | 15.00 | | | |
| 34-7-36 | 3.00 | 3.00 | | | | | | | | | |
| 30-7-36 | 5.73 | | | | | | | 5.73 | | | |
| 29-7-36 | 0.50 | | | | | | | 0.50 | | | |
| | 51.73 | 3.00 | | | | | 1.00 | 47.73 | | | |
| | | | | | 1884 | | | | | | |
| 28-7-36 | 15.70 | 15.70 | | | | | | | | | |
| 24-7-37 | 3.00 | | | | | | 3.00 | | | | |
| 25-7-37 | 2.00 | | | | | | 2.00 | | | | |
| 26-7-37 | 3.00 | | | | | | 3.00 | | | | |
| 4-6-35 | 103.00 | 25.00 | 15.00 | | | 30.00 | | | 33.00 | | |
| 33-7-36 | 87.78 | 87.78 | | | | | | | | | |
| 5-6-35 | 60.00 | | 10.00 | | | | | | 50.00 | | |
| | 274.48 | 128.48 | 25.00 | | | 30.00 | 8.00 | | 83.00 | | |
| [fol. 250] | | | | | 1885 | | | | | | |
| 21-7-36 | 20.00 | | | | | 20.00 | | | | | |
| 28-7-36 | 2.88 | | 2.88 | | | | | | | | |
| 36-7-35 | 15.00 | 15.00 | | | | | | | | | |
| 27-7-35 | 57.00 | 7.00 | | | | | | | 50.00 | | |
| | 94.88 | 22.00 | 2.88 | | | 20.00 | | | 50.00 | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 17-7-37 | 25.10 | 9.00 | | 1886 | 16.10 | | | | |
| 22-7-36 | 2.00 | | | | | | 2.00 | | |
| 2-6-35 | 18.50 | 18.50 | | | | | | | |
| 5-6-36 & 32-7-36 | 95.75 | 95.75 | | | | | | | |
| 33-7-36 | 10.00 | | 10.00 | | | | | | |
| 9-6-35 | 20.00 | 5.00 | | | | 15.00 | | | |
| | 171.35 | 128.25 | 10.00 | | 16.10 | 15.00 | 2.00 | | |
| [fol. 251] | | | | 1887 | | | | | |
| 28-7-35 | 25.00 | 20.00 | | | 5.00 | | | | |
| 28-7-36 | 5.00 | 5.00 | | | | | | | |
| 20-7-36 | 0.50 | 0.50 | | | | | | | |
| | 30.50 | 25.50 | | | 5.00 | | | | |
| | | | | 1889 | | | | | |
| 28-7-36 | 15.00 | 10.00 | | | | | 5.00 | | |
| 19-7-36 | 17.75 | | | | | 7.75 | 10.00 | | |
| 24-7-35 | 83.66 | 15.00 | | | 20.00 | 10.00 | 38.66 | | |
| 16-6-35 | 52.00 | | | | | | | 52.00 | |
| 9-6-35 | 203.90 | 19.65 | | | 20.00 | 13.25 | | 151.00 | |
| 4-6-35 | 110.00 | | | | 30.00 | | | 80.00 | |
| 5-6-35 | 97.50 | 92.50 | | | | | | | 5.00 |
| | 579.81 | 137.15 | | | 70.00 | 31.00 | 53.66 | 283.00 | 5.00 |
| | | | | 1890 | | | | | |
| 22-7-37 | 6.00 | | | | | | 6.00 | | |
| 23-7-36 | 31.00 | | | | | | 31.00 | | |
| 22-7-36 | 11.00 | | | | | | 11.00 | | |
| 29-7-36 | 0.50 | 0.50 | | | | | | | |
| | 48.50 | 0.50 | | | | | 48.00 | | |

Washington—Continued

[fol. 252]

1891

| Section | Acres | 1 | 1D | 1R | 1RA | A2 | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35-7-37 | 5.00 | | | | | | | 5.00 | | | |
| 28-7-36 | 1.98 | 1.98 | | | | | | | | | |
| 14-6-35 | 67.19 | 61.19 | | | | | | | 6.00 | | |
| 11-6-35 | 40.00 | | | | | | | | 40.00 | | |
| 15-6-35 | 64.50 | 20.00 | | 29.50 | | | | | 15.00 | | |
| 9-6-35 | 29.00 | | 29.00 | | | | | | | | |
| | 207.67 | 83.17 | 29.00 | 29.50 | | | | 5.00 | 61.00 | | |

1892

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-6-33 | 60.00 | | | 60.00 | | | | | | | |
| 4-6-33 | 353.00 | | | 53.00 | 300.00 | | | | | | |
| 5-6-33 | 196.00 | 60.00 | | 106.00 | 30.00 | | | | | | |
| 6-6-33 | 141.00 | | | 91.00 | 50.00 | | | | | | |
| 7-6-33 | 120.00 | | | 60.00 | 60.00 | | | | | | |
| 8-6-33 | 360.00 | 100.00 | | 140.00 | 120.00 | | | | | | |
| 9-6-33 | 499.00 | | | 369.00 | 130.00 | | | | | | |
| 10-6-33 | 620.00 | | 20.00 | 490.00 | 90.00 | | | | 20.00 | | |
| 11-6-33 | 534.00 | | | 267.00 | 267.00 | | | | | | |

[fol. 253]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-6-33 | 330.00 | | | 20.00 | 310.00 | | | | | | |
| 13-6-33 | 556.00 | 90.00 | | 156.00 | 310.00 | | | | | | |
| 14-6-33 | 364.00 | | | 160.00 | 204.00 | | | | | | |
| 15-6-33 | 378.00 | | | 238.00 | 140.00 | | | | | | |
| 16-6-33 | 207.00 | | | 37.00 | 170.00 | | | | | | |
| 17-6-33 | 20.00 | | | 20.00 | | | | | | | |
| 3-6-34 | 145.00 | | | 145.00 | | | | | | | |
| 4-6-34 | 391.00 | | | 391.00 | | | | | | | |
| 5-6-34 | 189.00 | | | 189.00 | | | | | | | |
| 6-6-34 | 272.00 | | | 272.00 | | | | | | | |
| 7-6-34 | 48.00 | | | 48.00 | | | | | | | |
| 9-6-34 | 350.00 | | | 350.00 | | | | | | | |
| 10-6-34 | 187.00 | | | 187.00 | | | | | | | |
| 11-6-34 | 284.00 | | | 284.00 | | | | | | | |
| 12-6-34 | 50.00 | | | 50.00 | | | | | | | |

[fol. 254]

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14-6-34 | 86.00 | | | 86.00 | | | | | |
| 15-6-34 | 60.00 | | | 60.00 | | | | | |
| 18-6-34 | 132.00 | | | 132.00 | | | | | |
| 18-6-35 | 68.00 | | | 50.00 | | | 18.00 | | |
| 24-7-35 | 16.62 | | | | | | | 16.62 | |
| 25-7-35 | 369.66 | 369.66 | | | | | | | |
| 1-6-35 | 20.00 | 10.00 | | 10.00 | | | | | |
| 14-6-35 | 55.50 | 32.50 | | | | | | | 23.00 |
| 11-6-35 | 87.70 | 10.00 | | | | | | | 77.70 |
| 35-7-34 | 110.00 | 20.00 | 40.00 | | | | | | 50.00 |
| 27-7-34 | 194.00 | 120.00 | | | | | | | 74.00 |
| 34-7-34 | 130.00 | 10.00 | 60.00 | | | 10.00 | | | 50.00 |
| 19-7-34 | 85.00 | 15.00 | | | | | | | 70.00 |
| 30-7-34 | 226.00 | 60.00 | | | | | | | 166.00 |

[fol. 355]

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25-7-33 | 160.00 | 80.00 | | | | | | | 80.00 |
| 32-7-34 | 65.00 | 28.00 | | | | | | | 37.00 |
| 5-6-34 | 87.00 | 10.00 | | | | | | | 77.00 |
| 31-7-34 | 115.00 | 30.00 | 8.00 | 50.00 | | | | | 27.00 |
| 4-6-34 | 43.00 | | | | | | | | 43.00 |
| 6-6-34 | 4.00 | | | 4.00 | | | | | |
| 29-7-34 | 2.11 | | | | | | | | 2.11 |
| 11-6-35 | 65.65 | 14.00 | | | | | | | 51.65 |
| 10-6-35 | 52.50 | | 15.00 | | | | | | 37.50 |
| | 8,888.74 | 1,059.16 | 143.00 | 4,575.00 | 2,181.00 | 10.00 | 18.00 | 16.62 | 885.96 |
| | | | | | 1893 | | | | |
| 5-6-36 | 6.00 | 6.00 | | | | | | | |
| 11-6-35 | 12.00 | | | | | | | | 12.00 |
| 33-7-34 | 124.96 | | | | | | | | 124.96 |
| 32-7-34 | 233.00 | 8.00 | 5.00 | | | | | | 220.00 |
| 34-7-34 | 74.00 | | | | | | | | 74.00 |
| | 449.96 | 14.00 | 5.00 | | | | | | 430.96 |

## Washington—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [fol. 256] | | | | | 1894 | | | | | | |
| 1-6-37 | 20.00 | | | | | 20.00 | | | | | |
| 16-7-37 | 26.00 | | | | | | | 26.00 | | | |
| 28-7-35 | 20.00 | 10.00 | 10.00 | | | | | | | | |
| 29-7-35 | 118.00 | 88.00 | | | | | | 30.00 | | | |
| 32-7-35 | 15.00 | 15.00 | | | | | | | | | |
| 31-7-35 | 10.00 | | | | | | | 10.00 | | | |
| 27-7-36 | 1.00 | 1.00 | | | | | | | | | |
| 4-6-35 | 12.00 | 12.00 | | | | | | | | | |
| 9-6-35 | 122.10 | 36.50 | 59.00 | | | | 10.00 | 16.60 | | | |
| 3-6-35 | 8.00 | | | | | | | | 8.00 | | |
| 5-6-35 | 25.60 | | 15.60 | | | | | | | 10.00 | |
| 6-6-35 | 20.00 | 12.00 | | | | | | | 8.00 | | |
| | 397.70 | 174.50 | 84.60 | | | 20.00 | 10.00 | 82.60 | 16.00 | 10.00 | |
| [fol. 257] | | | | | 1895 | | | | | | |
| 35-7-37 | 8.00 | | | | | | | 8.00 | | | |
| 22-7-36 | 2.75 | | | | | | | 2.75 | | | |
| 2-6-35 | 115.00 | 15.00 | | | | | | | 100.00 | | |
| 11-6-35 | 71.00 | 35.00 | | 29.00 | | | | | 7.00 | | |
| 3-6-35 | 35.00 | 25.00 | | 4.00 | | | | | 6.00 | | |
| 29-7-36 | 0.25 | 0.25 | | | | | | | | | |
| 33-7-36 | 15.00 | | 15.00 | | | | | | | | |
| 28-7-35 | 20.00 | 20.00 | | | | | | | | | |
| | 267.00 | 95.25 | 15.00 | 33.00 | | | | 10.75 | 113.00 | | |
| [fol. 258] | | | | | 1896 | | | | | | |
| 28-7-35 | 82.66 | 66.44 | 10.00 | | | | 6.22 | | | | |
| 27-7-35 | 100.00 | 15.00 | | | | | | | 85.00 | | |
| 36-7-35 | 3.25 | 3.25 | | | | | | | | | |
| 33-7-35 | 5.00 | | | 5.00 | | | | | | | |
| 32-7-36 | 1.50 | | | 1.50 | | | | | | | |
| 4-6-35 | 65.00 | | 65.00 | | | | | | | | |
| 29-7-36 | 1.60 | 1.60 | | | | | | | | | |
| 27-7-36 | 1.38 | | | | | | 1.38 | | | | |
| | 260.39 | 86.29 | 75.00 | 6.50 | | | 7.60 | | 85.00 | | |

| | | | | |
|---|---|---|---|---|
| 22-7-35 | 0.50 | | | |
| 6-6-36 | 40.00 | 40.00 | | |
| 33-7-36 | 47.75 | 9.50 | | 38.25 |
| | 88.25 | 49.50 | | 38.25 |
| 33-7-36 | 5.00 | | | 5.00 |
| 33-7-35 | 36.00 | 26.00 | 10.00 | |
| | 41.00 | 26.00 | 10.00 | 5.00 |

[fol. 259]

| | | | | |
|---|---|---|---|---|
| 13-7-36 | 10.00 | | | |
| 22-7-36 | 7.50 | | | |
| 36-7-35 | 17.25 | | | |
| 27-7-36 | 16.58 | | | |
| 33-7-36 | 3.50 | 3.50 | | |
| 6-6-36 | 20.00 | 20.00 | | |
| 16-7-37 | 5.00 | 5.00 | | |
| 28-7-36 | 1.00 | 1.00 | | |
| 31-7-35 | 65.00 | 15.00 | 20.00 | |
| 32-7-35 | 70.00 | | 15.00 | |
| | 215.83 | 44.50 | 35.00 | |

[fol. 260]

| | | | | |
|---|---|---|---|---|
| 2-6-37 | 2.00 | | | |
| 22-7-36 | 23.33 | | | |
| 21-7-36 | 1.50 | | | |
| 30-7-36 | 6.75 | | | |
| 2-6-35 | 20.00 | | 10.00 | |
| 27-7-35 | 52.00 | 15.00 | 10.00 | |
| 16-6-35 | 1.00 | | | |
| | 106.58 | 15.00 | 20.00 | |

| | | | | | |
|---|---|---|---|---|---|
| 1897 | | | | | |
| | | | | 0.50 | |
| | | | | 0.50 | |
| 1899 | | | | | |
| 1900 | | | | | |
| | | | | 10.00 | |
| | | | | 7.50 | |
| | 17.25 | | | | |
| | | 16.58 | | | |
| | | | | | Page 95 in Decree |
| | | | | | 30.00 |
| | | | | | 55.00 |
| | 17.25 | 16.58 | 17.50 | 85.00 | |
| 1901 | | | | | |
| | 2.00 | | | | |
| | | | 23.33 | | |
| | | | 1.50 | | |
| | | | 6.75 | | |
| | 10.00 | | | | |
| | | | | 27.00 | |
| | | | | 1.00 | |
| | 12.00 | | 31.58 | 28.00 | |

Washington—Continued

1902

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 28-7-36 | 1.00 | | | | | | | 1.00 | | | |
| 31-7-35 | 52.00 | 10.00 | | | | | | | 42.00 | | |
| 10-6-35 | 38.00 | 10.00 | 10.00 | | | 18.00 | | | | | |
| 32 & 33-7-35 | 37.00 | 15.00 | 7.00 | | | | | | 15.00 | | |
| | 128.00 | 35.00 | 17.00 | | | 18.00 | | 1.00 | 57.00 | | |

[fol. 261]

1903

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-7-36 | 1.66 | | | | | | | 1.66 | | | |
| 28-7-36 | 0.90 | | | | | | | 0.90 | | | |
| 10-6-35 | 17.00 | 12.00 | 5.00 | | | | | | | | |
| 25-7-31 | 40.00 | | | | | 40.00 | | | | | |
| | 59.56 | 12.00 | 5.00 | | | 40.00 | | 2.56 | | | |

1904

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35-7-33 | 120.00 | 40.00 | | | | | | | 10.00 | 70.00 | |
| 2-6-33 | 20.00 | 15.00 | | | | | | | 5.00 | | |
| 34-7-33 | 160.00 | 80.00 | | | | | | | 30.00 | 50.00 | |
| 29-7-38 | 1.00 | | | | | | | 1.00 | | | |
| 23-7-35 | 29.61 | 29.61 | | | | | | | | | |
| 26-7-35 | 432.58 | 374.44 | | | | 58.14 | | | | | |
| 28-7-35 | 19.00 | 9.00 | | | | | | | 10.00 | | |
| 25-7-34 | 20.00 | 10.00 | 2.00 | | | | | 8.00 | | | |
| 36-7-34 | 232.00 | 116.00 | 17.00 | | | | 14.00 | | 85.00 | | |
| 35-7-34 | 75.00 | 30.00 | 15.00 | | | | | | 30.00 | | |

[fol. 262]

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-7-36 | 0.50 | | | | | | | 0.50 | | | |
| 36-7-35 | 5.00 | 5.00 | | | | | | | | | |
| 28-7-36 | 3.50 | 1.00 | | | | | 2.50 | | | | |
| 33-7-36 | 8.59 | | | 8.59 | | | | | | | |
| 11-6-35 | 28.00 | | | | | | | | 28.00 | | |
| 29-7-36 | 0.25 | | | | | | | 0.25 | | | |
| | 1,155.03 | 710.05 | 34.00 | 8.59 | | 58.14 | 16.50 | 9.75 | 198.00 | 120.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 22-7-36 | 2.00 | | | | 1905 | | | 2.00 | |
| 28-7-36 | 0.50 | | | | | | | 0.50 | |
| 23-7-36 | 13.00 | | | | | | | 13.00 | |
| 24-7-35 | 3.80 | | | | | | | 3.80 | |
| 16-6-35 | 10.00 | 5.00 | 5.00 | | | | | | |
| 33-7-35 | 78.70 | 78.70 | | | | | | | |
| | 108.00 | 83.70 | 5.00 | | | | | 19.30 | |
| [fol. 263] | | | | | 1906 | | | | |
| 28-7-36 | 2.50 | | 2.50 | | | | | | |
| 6-6-36 | 26.00 | 26.00 | | | | | | | |
| 12-6-35 | 96.00 | 70.00 | | | | | | | 26.00 |
| | 124.50 | 96.00 | 2.50 | | | | | | 26.00 |
| | | | | | 1907 | | | | |
| 2-6-37 | 9.00 | | | | | 4.00 | | 5.00 | |
| 23-7-36 | 5.00 | | | | | | | 5.00 | |
| 22-7-36 | 10.00 | | | | | | | 10.00 | |
| 12-6-35 | 35.00 | 10.00 | 5.00 | | | 20.00 | | | |
| 32 & 2-6-35 | 18.00 | 18.00 | | | | | | | |
| 34-7-36 | 16.00 | | | 16.00 | | | | | |
| 6-6-36 | 59.90 | 55.90 | 4.00 | | | | | | |
| 4-6-34 | 50.00 | | | | | | | | 50.00 |
| | 202.90 | 83.90 | 9.00 | 16.00 | | 24.00 | | 20.00 | 50.00 |
| [fol. 264] | | | | | 1908 | | | | |
| 28-7-35 | 8.00 | | 8.00 | | | | | | |
| 35-7-35 | 6.00 | 4.00 | | | | 2.00 | | | |
| 6-6-36 | 34.75 | 34.75 | | | | | | | |
| 1-6-35 | 20.00 | 20.00 | | | | | | | |
| 33-7-36 | 5.00 | | | 5.00 | | | | | |
| 3 & 10-6-35 | 160.80 | 20.00 | 10.00 | | | 85.80 | 5.00 | 9.00 | 31.00 |
| 36-7-34 | 65.00 | 8.00 | 20.00 | | | 7.00 | | | 30.00 |
| | 299.55 | 86.75 | 38.00 | 5.00 | | 94.80 | 5.00 | 9.00 | 61.00 |

Washington—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1909 | | | | | | |
| 6-6-36 | 22.00 | 20.00 | | 2.00 | | | | | | | |
| 28-7-36 | 1.50 | | | | | 1.00 | | 0.50 | | | |
| | 23.50 | 20.00 | | 2.00 | | 1.00 | | 0.50 | | | |
| | | | | | 1910 | | | | | | |
| 28-7-35 | 17.00 | | 17.00 | | | | | | | | |
| 28-7-36 | 0.63 | 0.30 | | | | 0.33 | | | | | |
| 30-7-36 | 1.70 | | | | | | | 1.70 | | | |
| | 19.33 | 0.30 | 17.00 | | | 0.33 | | 1.70 | | | |
| | | | | | 1911 | | | | | | |
| 27-7-35 | 50.00 | 15.00 | 15.00 | | | | | | 20.00 | | |
| | 50.00 | 15.00 | 15.00 | | | | | | 20.00 | | |
| [fol. 265] | | | | | 1912 | | | | | | |
| 22-7-36 | 4.00 | | | | | | | 4.00 | | | |
| 1-6-35 | 16.00 | 16.00 | | | | | | | | | |
| 4 & 9 & 10 & 3-6-35 | 15.00 | | 15.00 | | | | | | | | |
| | 35.00 | 16.00 | 15.00 | | | | | 4.00 | | | |
| | | | | | 1913 | | | | | | |
| 26-6-35 | 6.95 | | | | | 6.95 | | | | | |
| 28-7-36 | 0.86 | | | | | 0.86 | | | | | |
| 2-6-35 | 10.75 | 10.75 | | | | | | | | | |
| 1-6-35 | 2.00 | | 2.00 | | | | | | | | |
| 13-7-36 | 3.56 | | | | | 3.50 | | | | | |
| | 24.06 | 10.75 | 2.00 | | | 11.31 | | | | | |
| | | | | | 1914 | | | | | | |
| 24-7-35 | 80.00 | 80.00 | | | | | | | | | |
| 35-7-35 | 37.00 | 15.00 | 22.00 | | | | | | | | |
| 2-7-36 | 7.00 | | 7.00 | | | | | | | | |
| 6-7-36 | 7.50 | | | 7.50 | | | | | | | |
| | 131.50 | 95.00 | 29.00 | 7.50 | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [fol. 266] | | | | | 1915 | | | |
| 28–7–36 | 1.10 | | | | | 1.10 | | |
| 33–7–36 | 10.00 | | | | | | 10.00 | |
| | 11.10 | | | | | 1.10 | 10.00 | |
| | | | | | 1916 | | | |
| 28–7–36 | 0.40 | | | | | 0.40 | | |
| 35 & 36–7–34 | 25.00 | | 20.00 | | | | | 5.00 |
| 26–7–34 | 8.00 | | | | | | 8.00 | |
| | 33.40 | | 20.00 | | | 0.40 | 8.00 | 5.00 |
| | | | | | 1917 | | | |
| 28–7–36 | 1.08 | | | | | 1.08 | | |
| 6–6–36 | 30.00 | | | 30.00 | | | | |
| 31–7–36 | 30.20 | | | 30.20 | | | | |
| 5–6–35 | 21.00 | | 21.00 | | | | | |
| 5–6–36 | 8.50 | | 8.50 | | | | | |
| | 90.78 | | 29.50 | 60.20 | | 1.08 | | |
| [fol. 267] | | | | | 1919 | | | |
| 1–6–35 | 25.00 | 25.00 | | | | | | |
| 33–7–36 | 6.36 | 2.36 | | 4.00 | | | | |
| 4–6–35 | 9.00 | 5.00 | 4.00 | | | | | |
| 9–6–35 | 35.00 | | | | | | 35.00 | |
| | 75.36 | 32.36 | 4.00 | 4.00 | | | 35.00 | |
| | | | | | 1920 | | | |
| 22–7–36 | 2.00 | | | | | | 2.00 | |
| 28–7–36 | 1.24 | | | | | 1.24 | | |
| 3–6–35 | 18.00 | 13.00 | | 5.00 | | | | |
| 11–6–35 | 12.00 | 2.00 | 10.00 | | | | | |
| 16–6–35 | 17.00 | | | | | | | 17.00 |
| 36–7–33 | 50.00 | | | 50.00 | | | | |
| 15–6–35 | 15.00 | | | | | | | 15.00 |
| | 115.24 | 15.00 | 10.00 | 55.00 | | 1.24 | 2.00 | 32.00 |

Washington—Continued

[fol. 268]

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1921 | | | | | | |
| 28-7-36 | 0.52 | | | | | 0.52 | | | | | |
| 1-6-35 | 2.00 | | 2.00 | | | | | | | | |
| | 2.52 | | 2.00 | | | 0.52 | | | | | |
| | | | | | 1923 | | | | | | |
| 22-7-36 | 1.00 | | | | | | | 1.00 | | | |
| 28-7-36 | 10.00 | | 10.00 | | | | | | | | |
| | 11.00 | | 10.00 | | | | | 1.00 | | | |
| | | | | | 1924 | | | | | | |
| 2-6-37 | 6.00 | | | | | 6.00 | | | | | |
| 27-7-34 | 35.00 | | | | | | | | 35.00 | | |
| | 41.00 | | | | | 6.00 | | | 35.00 | | |
| | | | | | 1925 | | | | | | |
| 28-7-36 | 0.50 | | | | | 0.50 | | | | | |
| | 0.50 | | | | | 0.50 | | | | | |
| | | | | | 1926 | | | | | | |
| 30-7-38 | 12.00 | | | | | | | 12.00 | | | |
| 35-7-37 | 10.00 | | | | | | | 10.00 | | | |
| 26-7-37 | 52.80 | | | | | | | 52.80 | | | |
| 23-7-37 | 10.00 | | | | | | | 10.00 | | | |
| 22-7-37 | 50.00 | | | | | 50.00 | | | | | |
| 15-7-37 | 8.00 | 8.00 | | | | | | | | | |
| [fol. 269] | | | | | | | | | | | |
| 16-7-37 | 11.00 | 5.50 | | | | | | 5.50 | | | |
| 21-7-37 | 13.00 | | | | | 13.00 | | | | | |
| 17-7-37 | 100.00 | 30.00 | | | | 35.00 | 35.00 | | | | |
| 22-7-36 | 39.00 | | | | | | | 39.00 | | | |
| 24-7-35 | 61.00 | 61.00 | | | | | | | | | |
| 28-7-35 | 14.00 | | .00 | | | | | | | | |
| 25-7-34 | 30.00 | | | 30.00 | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 26-7-34 | 30.00 | | | 30.00 | | | | | | | |
| 30-7-34 | 20.00 | | | 20.00 | | | | | | | |
| 13-7-36 | 8.00 | | | | | 8.00 | | | | | |
| 34-7-36 | 5.00 | 5.00 | | | | | | | | | |
| 1-6-35 | 90.00 | 20.00 | 20.00 | 50.00 | | | | | | | |
| 2-6-35 | 10.00 | | | 10.00 | | | | | | | |
| 12-6-35 | 40.00 | | 15.00 | 10.00 | | | | | 15.00 | | |
| 31-7-34 | 40.00 | | | | | | | | 40.00 | | |
| 13-6-35 | 25.00 | | 15.00 | 10.00 | | | | | | | |
| [fol. 270] | | | | | | | | | | | |
| 4-6-35 | 27.00 | | 27.00 | | | | | | | | |
| 27-7-34 | 25.00 | | | | | | | | 25.00 | | |
| 30-7-34 | 100.00 | | 20.00 | | | | | | 80.00 | | |
| 29-7-34 | 160.00 | 70.00 | | | | | | | 90.00 | | |
| 36-7-34 | 39.00 | | | | | | | | 39.00 | | |
| 33-7-34 | 155.00 | | | | | | | | 155.00 | | |
| 32-7-35 | 8.00 | | 8.00 | | | | | | | | |
| 3-6-35 | 13.00 | 13.00 | | | | | | | | | |
| 35-7-34 | 25.00 | | | | | | | | 25.00 | | |
| 31-7-35 | 5.00 | | 5.00 | | | | | | | | |
| 29, 30, 31 & 32-7-34 | 284.00 | | | | | | | | 284.00 | | |
| 34-7-34 | 36.00 | | | | | | | | 36.00 | | |
| | 1,555.80 | 212.50 | 124.00 | 160.00 | | 106.00 | 35.00 | 129.30 | 789.00 | | |
| | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
| Grand Total | 18,086.64 | 4,137.88 | 917.48 | 5,043.54 | 2,181.00 | 690.40 | 303.13 | 1,156.29 | 3,516.92 | 140.00 | |

[fol. 271]

Doan Creek

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1871 | | | | | | |
| 33-7-35 | 60.00 | 60.00 | | | | | | | | | |
| | | | | | 1875 | | | | | | |
| 32-7-35 | 12.50 | | 12.50 | | | | | | | | |

## Doan Creek—Continued

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1880 | | | | | | |
| 32-7-35 | 2.00 | 2.00 | | | | | | | | | |
| | | | | | 1885 | | | | | | |
| 34-7-35 | 4.00 | | 4.00 | | | | | | | | |
| 32-7-35 | 5.00 | | 5.00 | | | | | | | | |
| | | | | | 1907 | | | | | | |
| 35-7-35 | 20.00 | 20.00 | | | | | | | | | |
| | | | | | 1909 | | | | | | |
| 34-7-35 | 120.00 | 80.00 | 10.00 | | | | | | 30.00 | | |
| | | | | | 1914 | | | | | | |
| 33-7-35 | 65.00 | 32.00 | 10.00 | | | 8.00 | | | 15.00 | | |
| 32-7-35 | 20.00 | 12.00 | | | | 8.00 | | | | | |
| | | | | | 1917 | | | | | | |
| 32-7-35 | 15.00 | 15.00 | | | | | | | | | |
| | 323.50 | 221.00 | 41.50 | | | 16.00 | | | 45.00 | | |

[fol. 272]

## Stone Creek

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1863 | | | | | | |
| 2-6-35 | 60.00 | 37.00 | 8.00 | | | | | | 15.00 | | |
| 31-32-7-36 | 162.00 | | | | | | 82.00 | 80.00 | | | |
| | | | | | 1865 | | | | | | |
| 31-7-35 | 47.20 | 22.20 | 10.00 | | | 15.00 | | | | | |
| | | | | | 1867 | | | | | | |
| 3-6-35 | 49.20 | 30.00 | 5.00 | | | 6.00 | | | 8.20 | | |
| | | | | | 1875 | | | | | | |
| 32-7-36 | 47.81 | | | | | | 10.00 | | 37.81 | | |
| | | | | | 1883 | | | | | | |
| 28-7-36 | 5.52 | 1.00 | | | | 4.52 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 28-7-36 | 42.04 | 22.75 | | 1884 | | | |
| 2-6-35 | 63.00 | 15.00 | 10.00 | 1888 | 11.29 | 8.00 | |
| 28-7-36 | 6.60 | 2.00 | | 1889 | 12.00 | | 26.00 |
| 36-7-35 | 10.00 | 10.00 | | 1890 | 4.60 | | |
| 3-6-35 | 21.22 | 10.00 | | 1894 | | | |
| 28-7-36 | 1.50 | 1.50 | | 1898 | 11.22 | | |
| 28-7-36 | 1.50 | 1.50 | | 1899 | | | |
| 28-7-36 | 18.87 | 18.87 | | 1901 | | | |
| 1-6-35 | 34.00 | 34.00 | | | | | |
| 2-6-35 | 10.00 | | 10.00 | 1904 | | | |
| 1-6-35 | 6.00 | 6.00 | | | | | |
| [fol. 273] | | | | | | | |
| 28-7-36 | 1.00 | 1.00 | | 1905 | | | |
| 28-7-36 | 0.75 | 0.75 | | 1906 | | | |
| 28-7-36 | 1.75 | 1.75 | | 1907 | | | |
| 29-7-36 | 5.00 | 5.00 | | | | | |
| 28-7-36 | 1.00 | 1.00 | | 1908 | | | |
| 28-7-36 | 7.00 | 7.00 | | 1909 | | | |
| 1-6-35 | 4.50 | 4.50 | | 1910 | | | |

[fol. 274] Permits in Washington

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1922 | | | | | | |
| 28–7–36 | 3.60 | | | | | 3.60 | | | | | |
| | | | | | 1927 | | | | | | |
| 33–7–34 | 15.00 | | | | | | | | 15.00 | | |
| | | | | | 1928 | | | | | | |
| 32–7–36 | 5.00 | 5.00 | | | | | | | | | |
| | | | | | 1929 | | | | | | |
| 33–7–36 | 7.50 | | | 7.50 | | | | | | | |
| | | | | | 1932 | | | | | | |
| 11–6–35 | 14.30 | 6.00 | | | | | | | 8.30 | | |
| | 45.40 | 11.00 | | 7.50 | | 3.60 | | | 23.30 | | |

[fol. 275] WASHINGTON EXHIBIT No. 23

[Title omitted]

Tabulation (by Priorities) of the Estimated Acreages of the Related Lands in the State of Oregon Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to the Respective Priorities and Approximate Acreages Set Out in Stipulation No. 3 of November 10, 1933

Oregon

[fol. 276]

1862

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18-6-36 | 1.60 | 1.60 | | | | | | | | | |
| 20-5-36 | 28.94 | | | | | 10.00 | | 18.94 | | | |
| 24-5-36 | 5.30 | | | | | | 5.30 | | | | |
| | 35.84 | 1.60 | | | | 10.00 | 5.30 | 18.94 | | | |
| 1864 | | | | | | | | | | | |
| 13-6-35 | 38.22 | 13.22 | 10.00 | | | | | | 15.00 | | |
| | 38.22 | 13.22 | 10.00 | | | | | | 15.00 | | |
| 1865 | | | | | | | | | | | |
| 12-5-35 | 13.23 | | | | | | | 13.23 | | | |
| 20-5-36 | 22.39 | | | | | | 22.39 | | | | |
| 1-5-35 | 1.00 | | | | | | | 1.00 | | | |
| 13-6-36 | 0.50 | | 0.50 | | | | | | | | |
| | 37.12 | | 0.50 | | | | 22.39 | 14.23 | | | |
| 1866 | | | | | | | | | | | |
| 12-5-35 | 3.30 | | | | | | | 3.30 | | | |
| | 3.30 | | | | | | | 3.30 | | | |
| 1867 | | | | | | | | | | | |
| 24-6-35 | 6.00 | | 6.00 | | | | | | | | |
| 12-5-35 | 2.24 | | | | | | 2.24 | | | | |
| | 8.24 | | 6.00 | | | | 2.24 | | | | |
| 1868 | | | | | | | | | | | |
| 21-5-36 | 23.80 | 10.80 | 13.00 | | | | | | | | |
| 12-5-35 | 23.07 | | | | | | 23.07 | | | | |
| 13-5-35 | 5.35 | | | | | | 5.35 | | | | |
| 1-5-35 | 5.00 | | | | | | | 5.00 | | | |
| 23-6-35 | 4.00 | | | | | | | | 4.00 | | |
| | 61.22 | 10.80 | 13.00 | | | | 28.42 | 5.00 | 4.00 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12-5-35 | 1.18 | | | 1869 | | |
| 1-5-35 | 3.00 | | | | 1.18 | |
| | 4.18 | | | | | 3.00 |
| [fol. 277] | | | | | 1.18 | 3.00 |
| 23-6-35 | 9.50 | | 9.50 | 1870 | | |
| 22-5-36 | 11.10 | | | | 5.00 | 6.10 |
| 26-5-36 | 12.20 | | | | | 12.20 |
| 12-5-35 | 10.01 | | | | | 10.01 |
| 1-5-36 | 7.00 | | | | | 7.00 |
| | 49.81 | | 9.50 | | 5.00 | 35.31 |
| | | | | 1871 | | |
| 22-5-36 | 2.00 | | | | 2.00 | |
| 12-5-35 | 1.56 | | | | 1.56 | |
| 35-6-35 | 4.50 | | | | | 4.50 |
| 26-6-36 | 3.00 | | | | | 3.00 |
| | 11.06 | | | | 3.56 | 7.50 |
| | | | | 1872 | | |
| 21-5-36 | 3.50 | | | | 3.50 | |
| 4-4-36 | 10.00 | | | | 10.00 | |
| 2-5-35 | 8.64 | | | | | 8.64 |
| 12-5-35 | 4.21 | | | | | 4.21 |
| 1-5-35 | 18.43 | | | | | 18.43 |
| 26-6-35 | 1.00 | 1.00 | | | | |
| 27-6-35 | 10.00 | 5.00 | | | 5.00 | |
| | 55.78 | 6.00 | | | 18.50 | 31.28 |
| | | | | 1873 | | |
| 18-5-36 | 49.30 | | | | 25.00 | 24.30 |
| 12-5-35 | 9.20 | | | | 9.20 | |
| 7-5-36 | 7.00 | 4.00 | | | | 3.00 |
| | 65.50 | 4.00 | | | 34.20 | 27.30 |

## Oregon—Continued

[fol. 278]

1874

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12–5–35 | 3.86 | | | | | | | 3.86 | | | |
| 35–6–35 | 3.00 | | | | | | | 3.00 | | | |
| 14–6–35 | 18.40 | | | | | | | | 18.40 | | |
| | 25.26 | | | | | | | 6.86 | 18.40 | | |

1875

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36–5–36 | 6.00 | | | | | | | 6.00 | | | |
| 26–6–35 | 15.75 | | | | | | | 15.75 | | | |
| 12–5–35 | 8.56 | | | | | | 8.56 | | | | |
| 2–5–35 | 27.70 | | | | | | 10.00 | 17.70 | | | |
| 1–5–35 | 14.00 | | | | | | | 14.00 | | | |
| 20–5–36 | 6.31 | | | | | | 6.31 | | | | |
| 22–6–36 | 2.10 | 2.10 | | | | | | | | | |
| 4–4–36 | 3.90 | | | | | | | 3.90 | | | |
| 3–5–35 | 33.75 | | | | | | 16.75 | 17.00 | | | |
| 35–6–35 | 10.00 | | | | | | | 10.00 | | | |
| 14–6–35 | 148.06 | 20.00 | 47.06 | | | | | 26.00 | 55.00 | | |
| 15–6–35 | 77.60 | 18.00 | | | | | | 59.60 | | | |
| 23–6–35 | 44.20 | | 25.00 | | | | | | 19.20 | | |
| 24–6–36 | 4.00 | | 4.00 | | | | | | | | |
| | 401.93 | 40.10 | 76.06 | | | | 41.62 | 169.95 | 74.20 | | |

[fol. 279]

1876

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22–5–36 | 18.10 | | | | | | 18.10 | | | | |
| 5–4–37 | 8.14 | | | | | | 8.14 | | | | |
| 18–5–36 | 14.78 | | | | | | | 14.78 | | | |
| 31–5–36 | 4.50 | | | | | | | 4.50 | | | |
| 2–5–35 | 6.38 | | | | | | 6.38 | | | | |
| 35–6–35 | 5.00 | | | | | | | 5.00 | | | |
| 36–6–35 | 16.00 | | | | | | | 16.00 | | | |
| 33–6–35 | 15.00 | | | | | | | 15.00 | Waste | | |
| | 87.90 | | | | | | 32.62 | 55.28 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 20-5-36 | 38.54 | | | | 1877 | | | |
| 22-5-36 | 8.80 | | | | | | 38.54 | |
| 18-5-36 | 9.70 | | | | | | | 8.80 |
| 17-5-36 | 4.14 | | | | | | 9.70 | |
| 2-5-36 | 24.80 | | | | | 4.14 | | |
| 12-5-35 | 0.25 | | | | | | | 24.80 |
| 14-6-36 | 1.50 | 1.50 | | | | | 0.25 | |
| | 87.73 | 1.50 | | | | | | Lone Pine |
| [fol. 280] | | | | | | 4.14 | 48.49 | 33.60 |
| 21-5-36 | 26.00 | 10.00 | 3.00 | | 1878 | | | |
| 22-5-36 | 15.30 | 5.00 | | | | 8.00 | 5.00 | |
| 25-5-36 | 6.17 | | | | | 5.00 | 5.30 | |
| 12-5-35 | 11.87 | | | | | | 3.00 | 3.17 |
| 14-6-35 | 6.90 | 3.00 | | | | | 11.87 | |
| 26-6-35 | 6.00 | | | | | | | 3.90 |
| 25-6-35 | 9.50 | | | | | | | 6.00 |
| | 81.74 | 18.00 | 3.00 | | | | | 9.50 |
| | | | | | | 13.00 | 25.17 | 22.57 |
| 1-5-35 | 1.82 | | | | 1879 | | | |
| 12-5-35 | 1.91 | | | | | | | 1.82 |
| 35-6-35 | 13.00 | | | | | | 1.91 | |
| 36-6-35 | 14.82 | | | | | | | 13.00 |
| | 31.55 | | | | | | | 14.82 |
| | | | | | | | 1.91 | 29.64 |
| 24-5-36 | 10.00 | | | | 1880 | | | |
| 22-5-36 | 7.20 | | | | | | 10.00 | |
| 31-5-37 | 26.40 | | | | | | | 7.20 |
| 20-5-36 | 2.40 | | 2.40 | | | 13.40 | 13.00 | |
| 2-5-35 | 33.38 | | | | | | | |
| 12-5-35 | 15.70 | | | | | | 20.00 | 13.38 |
| 1-5-35 | 2.00 | | | | | | 15.70 | |
| 3-5-35 | 33.00 | | | | | | | 2.00 |
| 35-6-35 | 17.70 | | | | | | 15.00 | 18.00 |
| 33-6-35 | 10.00 | | | | | | | 17.70 |
| 4-5-35 | 12.32 | | | 12.32 | | | 5.00 | 5.00 |

## Oregon—Continued

[fol. 281

1880

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14-6-35 | 14.87 | | | | | | | | 14.87 | | |
| 15-6-35 | 40.00 | | | | | | 5.00 | 35.00 | | | |
| | 224.97 | | 2.40 | 12.32 | | 13.40 | 83.70 | 98.28 | 14.87 | | |
| | | | | | 1881 | | | | | | |
| 21-5-36 | 60.20 | | 15.00 | | | 5.00 | 30.20 | 10.00 | | | |
| 31-5-37 | 8.39 | | | | | 4.39 | 4.00 | | | | |
| 2-5-35 | 3.17 | | | | | | | 3.17 | | | |
| 3-5-35 | 15.00 | | | | | | 8.00 | 7.00 | | | |
| 35-6-35 | 26.70 | | | | | | | 26.70 | | | |
| 26-6-35 | 10.00 | 10.00 | | | | | | | | | |
| 23-6-35 | 6.50 | | | | | | 6.50 | | | | |
| 22-6-35 | 1.00 | | | | | | 1.00 | | | | |
| | 130.96 | 10.00 | 15.00 | | | 9.39 | 49.70 | 46.87 | | | |
| | | | | | 1882 | | | | | | |
| 24-5-36 | 2.00 | | | | | | 2.00 | | | | |
| 9-4-37 | 9.10 | | | | | | | 9.10 | | | |
| 12-5-35 | 0.33 | | | | | | 0.33 | | | | |
| 35-6-35 | 8.50 | | | | | | 8.50 | | | | |
| 26-6-35 | 9.75 | | | | | | | 9.75 | | | |
| 14-6-35 | 53.22 | | 26.22 | | | | | | 27.00 | | |
| 24-6-35 | 4.00 | | 4.00 | | | | | | | | |
| | 86.90 | | 30.22 | | | | 10.83 | 18.85 | 27.00 | | |
| [fol. 282] | | | | | 1883 | | | | | | |
| 5-4-37 | 7.25 | | | | | 7.25 | | | | | |
| 2-5-35 | 11.41 | | | | | | | 11.41 | | | |
| 12-5-35 | 7.03 | | | | | | 7.08 | | | | |
| 26-6-35 | 22.90 | | | | | | | 22.90 | | | |
| 35-6-35 | 6.50 | | | | | | | 6.50 | | | |
| 22-6-35 | 13.00 | | | | | 7.00 | 6.00 | | | | |
| | 68.09 | | | | | 14.25 | 13.03 | 40.81 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1884 | | | |
| 22-5-36 | 8.00 | | | | | | 8.00 | |
| 2-5-35 | 7.00 | | | | | | 7.00 | |
| 14-6-36 | 1.50 | 1.50 | | | | | | Lone Pine |
| | 16.50 | 1.50 | | | | | 15.00 | |
| | | | | | 1885 | | | |
| 22-5-36 | 29.40 | 14.40 | | | | | 15.00 | |
| 4-4-37 | 5.15 | | | | | | 5.15 | |
| 27-5-36 | 2.20 | | | | | | 2.20 | |
| 20-5-36 | 9.40 | | | | | | 9.40 | |
| 18-5-36 | 0.50 | | | | | | 0.50 | |
| 12-5-35 | 13.35 | | | | | 13.35 | | |
| 1-5-35 | 0.63 | | | | | | 0.63 | |
| 14-6-35 | 2.00 | | | 2.00 | | | | |
| 35-6-35 | 41.68 | | | | | | 41.68 | |
| 26-6-35 | 5.00 | | | | | | 5.00 | |
| 2-5-35 | 26.04 | | | | | | 26.04 | |
| 22-6-35 | 14.60 | | 7.00 | | | 7.00 | | |
| | 149.35 | 14.40 | 7.00 | 2.00 | | 20.35 | 105.60 | |
| [fol. 283] | | | | | 1886 | | | |
| 2-5-35 | 5.88 | | | | | | 5.88 | |
| 36-6-35 | 7.38 | | | | | | 7.38 | |
| 25-6-35 | 2.75 | 2.75 | | | | | | |
| 34-6-35 | 14.50 | | | | | | 14.50 | |
| 27-6-35 | 9.00 | | | | | | 9.00 | |
| 35-6-35 | 6.00 | | | | | | 6.00 | |
| 33-6-35 | 5.00 | | | | | | 5.00 | |
| 26-6-35 | 4.00 | | | | | | 4.00 | |
| 15-6-35 | 13.00 | 6.00 | | | | 7.00 | | |
| 22-6-35 | 19.00 | 9.00 | | | 10.00 | | | |
| | 86.51 | 17.75 | | | 10.00 | 7.00 | 51.76 | |

Oregon—Continued

1887

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-5-36 | 1.00 | | | | | | 1.00 | | | | |
| 25-5-36 | 15.10 | | | | | | | 15.10 | | | |
| 31-5-37 | 9.61 | | | | | | 9.61 | | | | |
| 2-5-35 | 21.18 | | | | | | | 21.18 | | | |
| 12-5-35 | 0.34 | | | | | | 0.34 | | | | |
| 25-6-35 | 44.55 | 20.00 | 10.00 | | | | | 14.55 | | | |
| 36-6-35 | 19.00 | | | | | | | 19.00 | | | |
| 35-6-35 | 18.70 | | | | | | | 18.70 | | | |
| 1-5-35 | 4.40 | | | | | | | 4.40 | | | |
| 23-6-35 | 61.60 | | 29.00 | | | | | | 32.60 | | |
| 27-6-35 | 12.28 | 6.28 | | | | | | | 6.00 | | |
| 26-6-35 | 10.00 | | | | | | | 10.00 | | | |
| | 217.76 | 26.28 | 39.00 | | | | 10.95 | 102.93 | 38.60 | | |

[fol. 284]

1888

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 19-5-37 | 17.10 | | | | | | | 17.10 | | | |
| 30-5-37 | 2.40 | | | | | | 2.40 | | | | |
| 23-5-36 | 14.40 | | | | | | | 14.40 | | | |
| 26-5-36 | 6.87 | | | | | | | 6.87 | | | |
| 10-4-37 | 9o00 | | | | | 9.00 | | | | | |
| 25-5-36 | 4.10 | | | | | | | 4.10 | | | |
| 2-5-35 | 4.92 | | | | | | | 4.92 | | | |
| 12-5-35 | 3.79 | | | | | | 3.79 | | | | |
| 3-5-35 | 5.00 | | | | | | 5.00 | | | | |
| 1-5-35 | 0.50 | | | | | | | 0.50 | | | |
| 26-6-35 | 9.75 | | | | | | | 9.75 | | | |
| 27-6-35 | 14.55 | 7.55 | | | | | | 7.00 | | | |
| 35-6-35 | 1.00 | | | | | | | 1.00 | | | |
| | 93.38 | 7.55 | | | | 9.00 | 11.19 | 65.64 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 1889 | | | | |
| 22-5-36 | 13.90 | 5.00 | | | | | 8.90 | |
| 24-5-36 | 1.50 | | | | | 1.50 | | |
| 23-5-36 | 10.20 | | | | | 5.20 | 5.00 | |
| 28-5-36 | 5.00 | | | | | | 5.00 | |
| 12-5-35 | 1.15 | | | | | 1.15 | | |
| 2-5-35 | 7.86 | | | | | | 7.86 | |
| 36-6-35 | 10.75 | | | | | | 10.75 | |
| 35-6-35 | 14.25 | | | | | | 14.25 | |
| 24-6-35 | 8.00 | | 8.00 | | | | | |
| | 72.61 | 5.00 | 8.00 | | | 7.85 | 51.76 | |
| [fol. 285] | | | | 1890 | | | | |
| 22-6-35 | 8.29 | 8.29 | | | | | | |
| 13-5-35 | 2.94 | | | | | 2.94 | | |
| 15-6-35 | 52.00 | 15.00 | | | | 19.00 | 18.00 | |
| 21-5-36 | 6.50 | | | | | | 6.50 | |
| 12-5-35 | 3.13 | | | | | 3.13 | | |
| 2-5-35 | 5.62 | | | | | | 5.62 | |
| 3-5-35 | 15.00 | | | | | 15.00 | | |
| 1-5-35 | 3.12 | | | | | | 3.12 | |
| 34-6-35 | 4.00 | | | | | | 4.00 | |
| 14-6-35 | 8.00 | | | | | | | 8.00 |
| 35-6-35 | 51.22 | | | | | | 51.22 | |
| 26-6-35 | 23.53 | | | | | | 23.53 | |
| 1-5-36 | 0.70 | | | | | | 0.70 | |
| | 184.05 | 23.29 | | | | 40.07 | 112.69 | 8.00 |
| | | | | 1891 | | | | |
| 28-5-37 | 5.10 | | | | | | 5.10 | |
| 29-5-37 | 15.10 | | | | | | 15.10 | |
| 24-5-36 | 5.20 | | | | | 5.20 | | |
| 9-4-37 | 1.00 | | | | | | 1.00 | |
| 10-4-37 | 1.50 | | | | 1.50 | | | |
| 22-5-36 | 6.50 | 3.25 | 3.25 | | | | | |
| 3-5-35 | 10.00 | | | | | 10.00 | | |

## Oregon—Continued

[fol. 286]

1891

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-5-36 | 2.00 | | | | | | | 2.00 | | | |
| 36-6-35 | 31.98 | | | | | | | 31.98 | | | |
| 1-5-35 | 4.63 | | | | | | | 4.63 | | | |
| 2-5-35 | 1.58 | | | | | | 1.58 | | | | |
| 35-6-35 | 19.57 | | | | | | | 19.57 | | | |
| 36-6-35 | 8.83 | 8.83 | | | | | | | | | |
| 26-6-35 | 18.50 | 9.50 | | | | | | 9.00 | | | |
| | 131.49 | 21.58 | 3.25 | | | 1.50 | 16.78 | 88.38 | | | |

1892

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14-6-35 | 31.50 | | 14.50 | | | | | | 17.00 | | |
| 35-6-35 | 12.30 | | | | | | | 12.30 | | | |
| 27-6-35 | 58.20 | 58.20 | | | | | | | | | |
| 24-5-36 | 11.00 | | | | | | 11.00 | | | | |
| 12-5-35 | 1.39 | | | | | | 1.39 | | | | |
| 2-5-35 | 12.73 | | | | | | | 12.73 | | | |
| 15-6-35 | 5.00 | | | | | | | 5.00 | | | |
| 22-6-35 | 10.00 | | | | | | 10.00 | | | | |
| 36-6-35 | 79.41 | | | | | | | 79.41 | | | |
| 26-6-35 | 29.66 | 14.00 | | | | | 15.66 | | | | |
| 23-6-35 | 28.00 | | 20.00 | | | | 8.00 | | | | |
| 1-5-35 | 1.84 | | | | | | | 1.84 | | | |
| | 281.03 | 72.20 | 34.50 | | | | 46.05 | 111.28 | 17.00 | | |

[fol. 287]

1893

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-6-35 | 9.75 | | | | | | | 9.75 | | | |
| 30-5-37 | 4.00 | | | | | | 4.00 | | | | |
| 23-5-36 | 1.00 | | | | | | | 1.00 | | | |
| 21-5-36 | 10.00 | | 10.00 | | | | | | | | |
| 5-4-37 | 4.41 | | | | | 4.41 | | | | | |
| 36-5-36 | 8.33 | | | | | | | 8.33 | | | |
| 2-5-35 | 27.52 | | | | | | | 27.52 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1-5-35 | 3.08 | | | | | 3.08 | | |
| 26-6-35 | 6.00 | | | | | | 6.00 | |
| 34-6-35 | 18.00 | | | | | | 18.00 | |
| 35-6-35 | 49.65 | | | | | | 49.65 | |
| 36-6-35 | 24.97 | | | | | | 24.97 | |
| 12-5-35 | 1.08 | | | | | 1.08 | | |
| | 167.79 | | 10.00 | | 4.41 | 8.16 | 145.22 | |
| | | | | 1894 | | | | |
| 15-6-35 | 77.00 | 28.00 | 5.00 | | | 26.00 | 18.00 | |
| 16-6-35 | 5.00 | 5.00 | | | | | | |
| 23-5-36 | 2.20 | | 2.20 | | | | | |
| 22-5-36 | 13.90 | 6.90 | | | | 7.00 | | |
| 26-5-36 | 6.80 | | | | | 6.80 | | |
| 2-5-35 | 4.48 | | | | | 4.48 | | |
| 3-5-35 | 10.00 | | | | | 10.00 | | |
| 12-5-35 | 3.37 | | | | | 3.37 | | |
| 36-6-35 | 17.00 | | | | | | 17.00 | |
| [fol. 288] | | | | 1894 | | | | |
| 35-6-35 | 9.00 | | | | | | 9.00 | |
| 18-6-36 | 10.00 | 10.00 | | | | | | 5.00 |
| 14-6-35 | 10.30 | | 5.30 | | | 6.00 | | |
| 26-6-35 | 6.00 | | | | | | 7.44 | |
| 1-5-35 | 7.44 | | | | | | 0.50 | |
| 35-6-35 | 0.50 | | | | | | | |
| 13-5-35 | 1.13 | | 1.13 | | | | | |
| | 184.12 | 49.90 | 13.63 | | | 63.65 | 51.94 | 5.00 |

Oregon—Continued

1895

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16–6–35 | 19.00 | 6.00 | 13.00 | | | | | | | | |
| 15–6–35 | 17.00 | 7.00 | | | | | | 10.00 | | | |
| 22–6–35 | 39.00 | 12.00 | 3.00 | | | 3.00 | 12.50 | 4.50 | 4.00 | | |
| 34–6–35 | 6.00 | | | | | | | 6.00 | | | |
| 12–5–35 | 0.24 | | | | | | 0.24 | | | | |
| 20–5–36 | 10.40 | | | | | | | 10.40 | | | |
| 23–5–36 | 9.10 | | | | | | | 9.10 | | | |
| 23–6–35 | 11.00 | | 7.00 | | | | | | 4.00 | | |
| 21–5–36 | 15.10 | 7.10 | | | | | 8.00 | | | | |
| 14–6–35 | 6.80 | 3.00 | | | | | | | 3.80 | | |
| 17–5–36 | 3.90 | | | | | | 3.90 | | | | |
| 24–6–35 | 10.00 | | 10.00 | | | | | | | | |
| 18–5–36 | 38.30 | | | | | 17.30 | 21.00 | | | | |
| 19–5–36 | 2.60 | | | | | 2.60 | | | | | |
| 36–6–35 | 16.00 | | | | | | | 16.00 | | | |
| [fol. 289] | | | | | 1895 | | | | | | |
| 5–4–36 | 11.90 | | | | | 11.90 | | | | | |
| 6–4–36 | 3.30 | 3.30 | | | | | | | | | |
| 31–5–36 | 9.10 | | | | | | | 9.10 | | | |
| 1–5–35 | 15.00 | | | | | | | 15.00 | | | |
| 2–5–35 | 15.65 | | | | | | | 15.65 | | | |
| 35–6–35 | 14.75 | | | | | | | 14.75 | | | |
| 26–6–35 | 13.40 | | | | | | | 13.40 | | | |
| | 287.54 | 38.40 | 33.00 | | | 34.80 | 45.64 | 123.90 | 11.80 | | |
| | | | | | 1896 | | | | | | |
| 2–5–35 | 12.19 | | | | | | | 12.19 | | | |
| 3–5–35 | 3.00 | | | | | | 3.00 | | | | |
| 23–6–35 | 5.50 | | 5.50 | | | | | | | | |
| 36–6–35 | 2.00 | | | | | | | 2.00 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27-6-35 | 1.00 | 1.00 | | | | | | |
| 1-5-35 | 1.03 | | | | | | 1.03 | |
| 26-6-35 | 6.00 | | | | | 6.00 | | |
| | 30.72 | 1.00 | 5.50 | | | 9.00 | 15.22 | |
| | | | | 1897 | | | | |
| 15-6-35 | 10.50 | | | | | | 10.50 | |
| 23-5-36 | 12.20 | | | | | | 12.20 | |
| 31-5-36 | 7.60 | | | | | | 7.60 | |
| 2-5-35 | 0.28 | | | | | 0.28 | | |
| 12-5-35 | 1.00 | | | | | 1.00 | | |
| 1-5-35 | 2.44 | | | | | | 2.44 | |
| 35-6-35 | 3.50 | | | | | | 3.50 | |
| 14-6-35 | 19.10 | | 10.10 | | | | | 9.00 |
| | 56.62 | | 10.10 | | | 1.28 | 36.24 | 9.00 |
| [fol. 290] | | | | 1898 | | | | |
| 15-6-35 | 9.50 | | | | | | 9.50 | |
| 25-5-36 | 6.00 | | | | 6.00 | | | |
| 26-6-35 | 4.00 | 4.00 | | | | | | |
| 2-5-35 | 1.34 | | | | | | 1.34 | |
| 13-5-35 | 2.49 | | | | | 2.49 | | |
| 36-6-35 | 11.20 | | | | | | 11.20 | |
| 1-5-35 | 3.67 | | | | | 3.67 | | .33 is Domestic water |
| 12-5-35 | 3.58 | | | | | 3.58 | | |
| 35-6-35 | 11.47 | | | | | | 11.47 | |
| | 53.25 | 4.00 | | | 6.00 | 9.74 | 33.51 | |
| | | | | 1899 | | | | |
| 12-5-35 | 0.94 | | | | | 0.94 | | |
| 1-5-35 | 5.12 | | | | | | 5.12 | |
| 26-6-35 | 1.00 | 1.00 | | | | | | |
| | 7.06 | 1.00 | | | | 0.94 | 5.12 | |

Oregon—Continued

1900

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-6-35 | 5.00 | 5.00 | | | | | | | | | |
| 15-6-35 | 34.20 | 19.20 | | | | | | 15.00 | | | |
| 25-6-35 (This should be in 15) | 0.80 | 0.80 | | | | | | | | | |
| 5-4-37 | 1.63 | | | | | 1.63 | | | | | |
| 22-5-36 | 4.60 | 4.60 | | | | | | | | | |
| 30-5-36 | 36.80 | 36.80 | | | | | | | | | |
| 31-5-36 | 8.60 | 8.60 | | | | | | | | | |
| 1-5-35 | 11.33 | | | | | | | 11.33 | | | |
| 12-5-35 | 1.54 | | | | | | 1.54 | | | | |
| 35-6-35 | 1.00 | | | | | | 1.00 | | | | |
| [fol. 291] | | | | | 1900 | | | | | | |
| 2-5-35 | 4.56 | | | | | | | 4.56 | | | |
| 3-5-35 | 35.60 | 10.00 | | | | | | 25.60 | | | |
| 23-6-35 | 24.70 | | 20.00 | | | | 4.07 | | | | |
| 27-6-35 | 7.50 | 3.50 | | | | | | 4.00 | | | |
| 24-6-35 | 3.00 | | 3.00 | | | | | | | | |
| 26-6-35 | 29.00 | | | | | | 14.00 | 15.00 | | | |
| 34-6-35 | 7.50 | | | | | | | 7.50 | | | |
| 36-6-35 | 21.64 | | | | | | | 21.64 | | | |
| | 239.00 | 88.50 | 23.00 | | | 1.63 | 21.24 | 104.63 | | | |
| | | | | | 1901 | | | | | | |
| 22-6-35 | 11.00 | | | | | | 11.00 | | | | |
| 1-5-35 | 1.65 | | | | | | 1.65 | | | | |
| 21-5-36 | 3.00 | | 3.00 | | | | | | | | |
| 2-5-35 | 4.04 | | | | | | 4.04 | | | | |
| 12-5-35 | 0.46 | | | | | | 0.46 | | | | |
| 36-6-35 | 15.97 | | | | | | | 15.97 | | | |
| 35-6-35 | 5.75 | | | | | | | 5.75 | | | |
| 33-6-35 | 30.00 | | | | | | 15.00 | 15.00 | | 15 acres waste | |
| 34-6-35 | 70.62 | | | | | | | 70.62 | | 16 acres surplus | |
| | 142.49 | | 3.00 | | | | 32.15 | 107.34 | | 18.9 acres | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1902 | | | | |
| 22-6-35 | 40.50 | 4.50 | 19.90 | | | | 3.00 | 14.00 | |
| 16-6-35 | 6.00 | | 6.00 | | | | | | In Wash. |
| 15-6-35 | 25.50 | 10.00 | | | | | 11.00 | 4.50 | |
| 22-5-36 | 6.90 | | | | | | 6.90 | | |
| 26-5-36 | 6.70 | | | | | 3.00 | | 3.70 | |
| [fol. 292] | | | | | | | | | |
| 2-5-35 | 1.12 | | | | | | | 1.12 | |
| 27-6-35 | 130.00 | 30.00 | 20.00 | 20.00 | | | | | 60.00 |
| 35-6-35 | 12.18 | | | | | | 12.18 | | |
| 33-6-35 | 34.10 | | | | | | 17.10 | 17.00 | (All surplus) |
| | 263.00 | 44.50 | 45.00 | 20.00 | | 3.00 | 50.18 | 40.32 | 60.00 |
| | | | | | 1903 | | | | |
| 32-6-35 | 181.70 | | | 181.70 | | | | | |
| 33-6-35 | 18.30 | | | | | | 18.30 | | |
| 34-6-35 | 50.75 | | | | | | | 50.75 | |
| 13-6-34 | 80.00 | | | 80.00 | | | | | In Wash. |
| 18-6-35 | 115.00 | 40.00 | | 25.00 | | | | | 50.00 In Wash. |
| 23-6-35 | 1.00 | | 1.00 | | | | | | (30 acres sub irr) |
| 22-6-35 | 6.50 | | | | | | 6.50 | | |
| 3-5-35 | 28.94 | | | | | | 28.94 | | (15.3 acres waste) |
| 26-6-35 | 8.00 | | | | | | | 8.00 | |
| 36-6-35 | 11.57 | | | | | | | 11.57 | |
| 12-5-35 | 1.16 | | | | | | 1.16 | | |
| 27-6-36 | 0.50 | 0.50 | | | | | | | |
| 1-5-35 | 4.85 | | | | | | | 4.85 | |
| 14-6-35 | 2.00 | | | | | | | | 2.00 |
| 35-6-35 | 11.56 | | | | | | | 11.56 | |
| 21-6-34 | 114.30 | | | | | 25.00 | 23.00 | 5.00 | 61.30 |
| 14-6-34 | 12.00 | 12.00 | | | | | | | |
| 5-5-35 | 8.40 | 8.40 | | | | | | | |
| [fol. 293] | | | | | | | | | |
| 27-6-34 | 135.00 | | | 135.00 | | | | | |
| 26-6-34 | 20.00 | | | | | | | | 20.00 |

Oregon—Continued

1903

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 28-6-34 | 59.00 | 6.00 | | 53.00 | | | | | | | |
| 17-6-35 | 184.67 | 13.00 | | 171.67 | | | | | | | |
| 18-6-35 | 250.06 | | | 250.06 | | | | | | | |
| 13-6-34 | 147.91 | | | 147.91 | | | | | | | |
| 23-6-34 | 62.00 | | | 52.00 | | | | | 10.00 | | |
| 19-6-35 | 226.50 | | | 171.50 | | | 40.00 | | 15.00 | | |
| 24-6-34 | 429.00 | | | 214.00 | | | | | 215.00 | | |
| 20-6-35 | 300.00 | 90.00 | | 210.00 | | | | | | | |
| 21-6-35 | 49.50 | | | 49.50 | | | | | | | |
| 28-6-35 | 52.60 | | | 52.60 | | | | | | | |
| 35-6-35 | 10.00 | | | | | | | 10.00 | | | |
| 29-6-35 | 27.30 | 10.00 | | | | | 7.30 | 10.00 | | | |
| 30-6-35 | 18.97 | 18.97 | | | | | | | | | |
| | 2,629.04 | 198.87 | 1.00 | 1,793.94 | | 25.00 | 125.20 | 111.73 | 373.30 | | |

1904

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-6-35 | 12.00 | 9.00 | | | | | 3.00 | | | | |
| 15-6-35 | 2.50 | 2.50 | | | | | | | | | |
| 35-6-35 | 2.50 | | | | | | | 2.50 | | | |
| 33-6-35 | 8.70 | | 8.70 | | | | | | | (Waste) | |
| 1-5-35 | 3.42 | | | | | | 3.42 | | | | |
| 24-6-35 | 1.00 | | 1.00 | | | | | | | | |
| 2-5-35 | 5.10 | | | | | | 5.10 | | | | |
| 36-6-35 | 11.00 | | | | | | 11.00 | | | | |
| | 46.22 | 11.50 | 9.70 | | | | 22.52 | 2.50 | | | |

[fol. 294]

1905

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-5-37 | 6.90 | | | | | | 6.90 | | | | |
| 25-5-36 | 14.00 | | | | | | | 14.00 | | | |
| 1-5-36 | 13.83 | | | 13.83 | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-5-35 | 5.65 | | | | | | | 5.65 | | |
| 26-6-35 | 13.52 | | | | | | | 13.52 | | |
| 35-6-35 | 18.74 | | | | | | | 18.74 | | |
| 34-6-35 | 6.40 | | | | | | | 6.40 | | |
| 36-6-35 | 10.31 | | | | | | | 10.31 | | |
| 3-5-35 | 24.80 | | | | | | 24.80 | | | 12.8 acres waste |
| | 114.15 | | | 13.83 | | | 31.70 | 68.62 | | |
| | | | | | 1906 | | | | | |
| 22-6-35 | 2.00 | | | | | | | | 2.00 | .38 acre sub |
| 16-6-35 | 14.00 | 14.00 | | | | | | | | |
| 21-5-36 | 9.50 | | | | | | | 9.50 | | |
| 17-5-36 | 1.86 | | | | | | | 1.86 | | |
| 13-5-35 | 5.00 | | | | | | | 5.00 | | |
| 24-6-35 | 35.00 | | 35.00 | | | | | | | |
| 30-6-36 | 6.50 | | | | | 6.50 | | | | |
| 31-6-36 | 1.50 | 1.50 | | | | | | | | |
| 35-6-35 | 9.30 | | | | | | | 9.30 | | |
| 26-6-35 | 6.40 | | | | | | | 6.40 | | |
| | 91.06 | 15.50 | 35.00 | | | 6.50 | | 32.06 | 2.00 | |
| [fol. 295] | | | | | 1907 | | | | | |
| 22-6-35 | 6.00 | 6.00 | | | | | | | | |
| 26-6-35 | 6.00 | | | | | | 6.00 | | | |
| 23-5-36 | 3.30 | | | | | | | 3.30 | | |
| 15-6-35 | 4.00 | 4.00 | | | | | | | | |
| 14-6-35 | 49.00 | | 20.00 | | | | | | 29.00 | |
| 24-5-36 | 2.50 | | | | | 2.50 | | | | |
| 26-6-35 | 7.19 | | 7.19 | | | | | | | |
| 24-6-35 | 5.00 | | 5.00 | | | | | | | |
| 26-5-36 | 2.00 | | | | | | | 2.00 | | |
| 12-5-35 | 1.00 | | | | | | 1.00 | | | |
| 21-5-36 | 2.00 | | | | | | 2.00 | | | |
| 36-6-35 | 3.75 | 3.75 | | | | | | | | (Waste) |
| 33-6-35 | 5.00 | | | | | | 5.00 | | | (Waste) |
| | 96.74 | 13.75 | 32.19 | | | 2.50 | 14.00 | 5.30 | 29.00 | |

## Oregon—Continued

1908

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15–6–35 | 16.90 | 16.90 | | | | | | | | | |
| 23–5–36 | 4.33 | | | | | | | 4.33 | | | |
| 21–5–36 | 7.70 | | | | | | | 7.70 | | | |
| 25–5–36 | 7.00 | | | | | 7.00 | | | | | |
| 3–5–35 | 0.70 | 0.70 | | | | | | | | | |
| 34–6–35 | 18.08 | 18.08 | | | | | | | | | |
| 23–6–35 | 9.00 | | 5.00 | | | | | | 4.00 | | |
| 31–5–37 | 5.40 | | | | | | 5.40 | | | | |
| 7–5–36 | 0.74 | 0.74 | | | | | | | | | |

[fol. 296]

1908

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4–5–35 | 13.98 | | | | | 13.98 | | | | Waste | |
| 3–5–35 | 24.86 | | | | | 12.00 | 12.86 | | | Waste | |
| 1–5–35 | 3.44 | | | | | | | 3.44 | | | |
| 12–5–35 | 1.15 | | | | | | 1.15 | | | | |
| 35–6–35 | 32.56 | | | | | | | 32.56 | | | |
| 26–6–35 | 103.75 | 50.00 | | | | | | 53.75 | | | |
| | 249.59 | 86.42 | 5.00 | | | 38.38 | 14.01 | 101.78 | 4.00 | | |

1909

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23–5–36 | 5.00 | | | | | | | 5.00 | | | |
| 24–5–36 | 0.50 | | | | | | 0.50 | | | | |
| 4–4–37 | 3.55 | | | | | | | 3.55 | | | |
| 24–6–35 | 87.80 | | 2.80 | 85.00 | | | | | | | |
| 20–5–36 | 6.86 | | | | | | 6.86 | | See Decree for year (Stipulation) | | |
| 13–6–35 | 213.00 | | | 213.00 | | | | | | | |
| | 316.71 | | 2.80 | 298.00 | | | 7.36 | 8.55 | | | |

1910

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27–6–35 | 33.25 | | | | | | | 33.25 | | | |
| | 33.25 | | | | | | | 33.25 | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1912 | | | | |
| 36-6-35 | 105.00 | | | 105.00 | | | | | |
| 1-5-35 | 85.00 | | | 85.00 | | | | | |
| 34-6-35 | 181.18 | | | | | | | 181.18 | |
| 35-6-35 | 71.00 | | | | | | | 71.00 | |
| 26-6-35 | 5.00 | | | | | | | 5.00 | |
| 27-6-35 | 116.46 | 40.00 | | | | | | 36.46 | 40.00 |
| 28-6-35 | 138.00 | | 115.00 | | | | | 23.00 | |
| 33-6-35 | 331.50 | 15.00 | 68.00 | | | | 90.00 | 138.50 | 20.00 |
| | 1,033.14 | 55.00 | 183.00 | 190.00 | | | 90.00 | 455.14 | 60.00 |
| [fol. 297] | | | | | 1913 | | | | |
| 27-6-35 | 70.00 | | | | | | 20.00 | 50.00 | |
| 28-6-35 | 98.00 | | 50.00 | | | | | 10.00 | 38.00 |
| 29-6-35 | 60.00 | 35.00 | | | | | | | 25.00 |
| 32-6-35 | 40.00 | 10.00 | | 10.00 | | 10.00 | 10.00 | | |
| 33-6-35 | 30.00 | | 20.00 | | | | | | 10.00 |
| 34-6-35 | 45.00 | | | | | | | 45.00 | |
| 35-6-35 | 8.50 | | | | | | | 8.50 | |
| 36-6-35 | 20.75 | | | | | | | 20.75 | |
| 2-5-35 | 20.00 | | | | | | | 20.00 | |
| | 392.25 | 45.00 | 70.00 | 10.00 | | 10.00 | 30.00 | 154.25 | 73.00 |
| | | | | | 1914 | | | | |
| 26-6-35 | 14.00 | | | | | | | 14.00 | |
| | 14.00 | | | | | | | 14.00 | |
| | | | | | 1915 | | | | |
| 33-6-35 | 37.00 | | | | | | 13.00 | 24.00 | |
| 34-6-35 | 10.00 | | | | | | | 10.00 | |
| 35-6-35 | 50.00 | | | | | | | 50.00 | |
| | 97.00 | | | | | | 13.00 | 84.00 | |

Oregon—Continued

1916

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27-6-35 | 5.50 | | | | | | | | 5.50 | | |
| 1-5-35 | 4.00 | | | 4.00 | | | | | | | |
| 25-6-35 | 5.00 | | | | | | | 5.00 | | Waste | |
| 36-6-35 | 4.00 | | | | | | | 4.00 | | | |
| 26-6-35 | 10.30 | | | | | | 5.30 | 5.00 | | | |
| | 28.80 | | | 4.00 | | | 5.30 | 14.00 | 5.50 | | |

1917

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36-6-35 | 10.00 | | | | | | | 10.00 | | | |
| 34-6-35 | 30.00 | | | | | | | 30.00 | | | |
| 27-6-35 | 19.00 | | | | | | | | 19.00 | | |
| | 59.00 | | | | | | | 40.00 | 19.00 | | |

[fol. 298]

1918

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34-6-35 | | 18.00 | | | | | | 18.00 | | Waste | |
| 22-6-35 | 4.00 | | | | | | | | | Drain & Waste | |
| 26-6-35 | 14.00 | 14.00 | | | | | | | 4.00 | | |
| | 36.00 | 14.00 | | | | | | 18.00 | 4.00 | | |

1919

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31-5-36 | 11.00 | | | | | | | 11.00 | | | |
| 34-6-35 | 11.00 | | | | | | | 11.00 | | | |
| 26-6-35 | 8.00 | | 8.00 | | | | | | | | |
| | 30.00 | | 8.00 | | | | | 22.00 | | | |

1920

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35-6-35 | 2.50 | | | | | | | 2.50 | | | |
| 25-6-35 | 20.00 | 15.00 | 5.00 | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 26–6–35 | 5.00 | | 5.00 | | | | | | |
| 3–5–35 | 15.00 | 15.00 | | | | | | | |
| | 42.50 | 30.00 | 10.00 | | | | 2.50 | | |
| | | | | | 1921 | | | | |
| 21–6–35 | 12.00 | | | | | 12.00 | | | |
| | 12.00 | | | | | 12.00 | | | |
| | | | | | 1922 | | | | |
| 33–6–35 | 20.00 | | 6.00 | 14.00 | | | | | Waste |
| 30–5–36 | 40.00 | | | | | | 40.00 | | |
| 31–5–36 | 10.00 | | | | | | 10.00 | | |
| 25–6–35 | 6.00 | | | | | | 6.00 | | Waste |
| 12–5–35 | 12.00 | | | 12.00 | | | | | |
| 34–6–35 | 26.00 | | | | | | 26.00 | | 20 acres waste |
| 3–5–35 | 10.00 | | | | | | 10.00 | | |
| 33–6–35 | 62.00 | | | | | 42.00 | 20.00 | | 42 acres waste |
| 26–6–35 | 9.00 | | | | | | 9.00 | | |
| [fol. 299] | | | | | 1922 | | | | |
| 13–6–35 | 25.00 | | 25.00 | | | | | | |
| 14–6–35 | 6.00 | | | | | | | 6.00 | |
| Permit 5551 | 10.00 | 10.00 | | | | | | | |
| Permit 5463 | 20.00 | 20.00 | | | | | | | |
| | 256.00 | 30.00 | 31.00 | 26.00 | | 42.00 | 121.00 | 6.00 | |
| | | | | | 1923 | | | | |
| 18–5–36 | 10.00 | | | | | | 10.00 | | |
| 25–6–35 | 50.00 | | | | | 25.00 | 25.00 | | |
| 33–6–35 | 27.00 | | | | | 7.00 | 20.00 | | Waste |
| 3–5–35 | 10.00 | | | | | | 10.00 | | |
| 26–6–35 | 19.00 | 5.00 | 14.00 | | | | | | |
| 7–5–36 | 4.00 | 4.00 | | | | | | | Waste |
| 23–6–35 | 15.00 | | 15.00 | | | | | | |
| 18–6–36 | 10.00 | | | 10.00 | | | | | |
| 13–6–35 | 27.00 | | | | | | | 27.00 | |
| Permit 5885 | 5.00 | | | | | 5.00 | | | |
| | 177.00 | 9.00 | 29.00 | 10.00 | | 37.00 | 65.00 | 27.00 | |

Oregon—Continued

1924

| Section | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-4-36 | 5.00 | | | 5.00 | | | | | | | |
| 6-4-36 | 8.00 | | | 8.00 | | | | | | | |
| 31-5-36 | 9.00 | 9.00 | | | | | | | | | |
| 34-6-35 | 10.00 | | | | | | | 10.00 | | | |
| Permit 6567 | 10.00 | | | | | | | 10.00 | | | |
| Permit 6753 | 10.00 | | | | | | | | No classification | | |
| Permit 6154 | 10.00 | | | | | | | | No classification | | |
| [fol. 300] | | | | | 1924 | | | | | | |
| Permit 6415 | 3.00 | | | | | | | | | | |
| Permit 6234 | 14.00 | | | | | | | | No classification for these permits | | |
| Permit 6552 | 7.00 | | | | | | | | | | |
| Permit 7191 | 5.00 | | | | | | | | | | |
| | 91.00 | 9.00 | | 13.00 | | | | 20.00 | | | |
| | | | | | 1925 | | | | | | |
| 1-5-35 | 5.00 | | | | | | 2.00 | 3.00 | | | |
| 3-5-35 | 20.00 | 3.00 | | | | 7.00 | 10.00 | | | | |
| 34-6-35 | 15.00 | | | | | | | 15.00 | | | |
| 13-6-35 | 7.00 | | | 7.00 | | | | | | | |
| Permit 6947 | 5.00 | | | | | | | | No classification | | |
| Permit 7109 | 10.00 | | | | | | | | No classification | | |
| | 62.00 | 3.00 | | 7.00 | | 7.00 | 12.00 | 18.00 | | | |
| | | | | | 1927 | | | | | | |
| 29-6-35 | 20.00 | | | | | | | | 20.00 | | |
| 33-6-35 | 6.00 | | | | | | | 6.00 | | | |
| 34-6-35 | 20.00 | | | | | | | 20.00 | | | |
| 26-6-35 | 30.90 | | | | | | | 30.90 | | | |
| 24-6-35 | 14.00 | | 14.00 | | | | | | | | |
| Permit 8212 | 1.50 | | | | | | | | No classification | | |
| | 92.40 | | 14.00 | | | | | 56.90 | 20.00 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1928 | | | | | | |
| 23–5–36 | 3.00 | | | | | | | 3.00 | | | |
| 26–5–36 | 7.50 | | | | | | | 7.50 | | | |
| 16–6–35 | 20.00 | | | | | | | | 20.00 | | |
| 20–6–35 | 49.00 | 20.00 | | 9.00 | | | | | 20.00 | | |
| 21–6–35 | 193.00 | 40.00 | | | | 20.00 | 64.00 | 34.00 | 35.00 | | |
| [fol. 301] | | | | | 1928 | | | | | | |
| 26–6–36 | 10.00 | | | | | | 10.00 | | | Waste | |
| 23–6–35 | 20.00 | | 10.00 | | | | | | 10.00 | | |
| | 302.50 | 60.00 | 10.00 | 9.00 | | 20.00 | 74.00 | 44.50 | 85.00 | | |
| | | | | | 1929 | | | | | | |
| 23–6–35 | 30.00 | | 15.00 | | | | | | 15.00 | | |
| | 30.00 | | 15.00 | | | | | | 15.00 | | |
| | | | | | 1930 | | | | | | |
| 25–6–35 | 5.00 | | | | | | | 5.00 | | | |
| 23–6–35 | 20.00 | | | | | | | | 20.00 | | |
| 34–6–35 | 19.80 | | | | | | | 19.80 | | | |
| | 44.80 | | | | | | | 24.80 | 20.00 | | |
| | | | | | 1931 | | | | | | |
| 18–6–35 | 1.00 | 1.00 | | | | | | | | | |
| | 1.00 | 1.00 | | | | | | | | | |
| | Acres | 1 | 1D | 1R | 1RA | 2A | 2B | 3 | 4 | 5 | 6 |
| Grand Total | 10,639.72 | 1,104.11 | 846.85 | 2,418.59 | | 243.90 | 1,360.17 | 3,554.93 | 1,045.67 | | |

(Permits) 65.50 acres not classified.

(Here follows 6 photos, folios 302-307.)

SHINGTON EXHIBIT NO. 24

1228 A

*Charge to the account of* DIVISION OF HYDRAULICS $

| CLASS OF SERVICE DESIRED | | | |
|---|---|---|---|
| DOMESTIC | | CABLE | |
| TELEGRAM | X | FULL RATE | |
| DAY LETTER | | DEFERRED | |
| NIGHT MESSAGE | | NIGHT LETTER | |
| NIGHT LETTER | | WEEK END LETTER | |

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

# WESTERN UNION

NEWCOMB CARLTON, PRESIDENT — J. C. WILLEVER, FIRST VICE-PRESIDENT

| CHECK |
|---|
| ACCT'G INFMN. |
| TIME FILED |

*Send the following message, subject to the terms on back hereof, which are hereby agreed to*

APRIL 23rd1 1930

RHEA LUPER

STATE ENGINEER

SALEM OREGON

JUST ADVISED ENTIRE WALLA WALLA RIVER BEING DIVERTED AT FREEWATER.

CHAS. J. BARTHOLET

302-303

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

WASHINGTON EXHIBIT NO.25

Charge to the account of DIVISION OF HYDRAULICS $

1228 A

| CLASS OF SERVICE DESIRED | | | |
|---|---|---|---|
| DOMESTIC | | CABLE | |
| TELEGRAM | | FULL RATE | |
| DAY LETTER | X | DEFERRED | |
| NIGHT MESSAGE | | NIGHT LETTER | |
| NIGHT LETTER | | WEEK END LETTER | |

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

# WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCT'G INFMN.

TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

APRIL 23rd, 1930

RHEA LUPER

SALEM OREGON

WILL YOU TAKE STEPS TO ENFORCE A MORE ECONOMIC USE OF WATER FROM WALLA WALLA RIVER IN MILTON AND FREEWATER SECTIONS OR CAUSE A REGULATION WHICH WILL GIVE WASHINGTON WATER USERS WATER TO WHICH THEY CLAIM THEY ARE ENTITLED STOP COMPLAINT COMES FROM WATER MASTER AND WALLA WALLA IRRIGATION DISTRICT.

CHAS. J. BARTHOLET

304-305

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

WASHINGTON EXHIBIT NO.26

Charge to the account of $

1228 A

| CLASS OF SERVICE DESIRED | | | |
|---|---|---|---|
| DOMESTIC | | CABLE | |
| TELEGRAM | | FULL RATE | |
| DAY LETTER | | DEFERRED | |
| NIGHT MESSAGE | | NIGHT LETTER | |
| NIGHT LETTER | | WEEK END LETTER | |

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

# WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCT'G INFMN.

TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

RECEIVED at 401 Capitol Way, Olympia, Wash.

EA63 43 DL= SALEM ORG 24 336P 1930 APR 24 PM 5 12

CHAS J. BARTHOLET=
OLYMPIA WASH=

BELIEVE IT HAS ALWAYS BEEN CUSTOMARY TO DIVERT IN OREGON THE ENTIRE FLOW OF THE WALLAWALLA RIVER AFTER SUCH DIVERSION RETURN SEPAGE USUALLY HAS SUPPLIED THE

[illegible] BY AUTHORITY WITHOUT COURT

APRIL 23rd, 1930

RHEA LUPER

SALEM OREGON

WILL YOU TAKE STEPS TO ENFORCE A MORE ECONOMIC USE OF WATER FROM WALLA WALLA RIVER IN MILTON AND FREEWATER SECTIONS OR CAUSE A REGULATION WHICH WILL GIVE WASHINGTON WATER USERS WATER TO WHICH THEY CLAIM THEY ARE ENTITLED STOP COMPLAINT COMES FROM WATER MASTER AND WALLA WALLA IRRIGATION DISTRICT.

CHAS. J. BARTHOLET

304-305

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

WASHINGTON EXHIBIT NO.26

Charge to the account of _____ $ _____ 1928 A

| CLASS OF SERVICE DESIRED | |
|---|---|
| DOMESTIC | CABLE |
| TELEGRAM | FULL RATE |
| DAY LETTER | DEFERRED |
| NIGHT MESSAGE | NIGHT LETTER |
| NIGHT LETTER | WEEK END LETTER |

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

# WESTERN UNION

NEWCOMB CARLTON, PRESIDENT — J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCT'G INFMN.

TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

RECEIVED at 401 Capitol Way, Olympia, Wash.

EA63 43 DL= SALEM ORG 24 336P 1930 APR 24 PM 5 12

CHAS J. BARTHOLET=
OLYMPIA WASH=

BELIEVE IT HAS ALWAYS BEEN CUSTOMARY TO DIVERT IN OREGON THE ENTIRE FLOW OF THE WALLAWALLA RIVER AFTER SUCH DIVERSION RETURN SEPAGE USUALLY HAS SUPPLIED THE WASHINGTON SIDE WE HAVE NO AUTHORITY WITHOUT COURT ORDER OR COMPACT TO RECOGNIZE RIGHTS OUTSIDE OF STATE=

RHEA LUPER STATE ENGINER.

IN THE SUPREME COURT OF THE UNITED STATES
October Term, 1933 PS

306-307

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

202

[fol. 308] WASHINGTON EXHIBIT No. 27

Tabulation of Administration of Related Stream System in Washington for Years 1929, 1930, 1931, 1932, and 1933

By Harlow Barney, Watermaster

[fol. 309] 1929 Administration of Related Stream System in Washington, by Harlow Barney, Water Master

June 1 to 10—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 1 to 10:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 1013.57 | 221.94 | 912.01 | 253.80 | ..... | 123.00 |

June 11 to 18—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed June 11 to 18:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 1217.36 | ..... | ..... | 1525.96 | 526.70 | ..... |

[fol. 310] 1930 Administration of Related Stream System in Washington by Harlow Barney, Water Master

June 10 to 19—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 10 to 19:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 1013.57 | 221.94 | 912.01 | 203.80 | ..... | 123.00 |

June 25 to July 6—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed June 25 to July 6:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 1217.36 | ..... | ..... | 1525.96 | 526.70 | ..... |

[fol. 311] 1931 Administration of Related Stream System in Washington by Harlow Barney, Water Master

May 26 to 30—All rights subsequent to 1894 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; East Little Walla Walla River; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed May 26 to 30:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 967.57 | 221.94 | 905.01 | 253.80 | ..... | 111.00 |

May 30 to June 3—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; East Walla Walla River; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed May 30 to June 3:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 46.00 | ..... | 7.00 | ..... | ..... | 12.00 |

June 3 to 7—All other rights subsequent to 1894 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on the Walla Walla River; and West Little Walla Walla River.

Acres closed June 3 to 7:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W River | East W. W. River |
|---|---|---|---|---|---|
| 1054.36 | ..... | ..... | 1525.96 | 339.00 | ..... |

[fol. 312] 1931 Administration of Related Stream System in Washington by Harlow Barney, Water Master (Continued)

June 3 to 10—All other rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed June 3 to 10:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 163.00 | ..... | ..... | 431.96 | 187.70 | ..... |

[fol. 313] 1932 Administration of Related Stream System in Washington by Harlow Barney, Water Master

June 27 to 30—All rights subsequent to 1904 were closed on Mill Creek above Gose Street: Garrison Creek; Yellow-hawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 27 to 30:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 455.10 | 150.28 | 535.71 | 253.80 | ..... | ..... |

July 9 to 12—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellow-hawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed July 9 to 12:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 558.47 | 71.66 | 376.30 | ..... | ..... | 123.00 |

July 12 to 16—All rights subsequent to 1904 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed July 12 to 16:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 247.70 | ..... | ..... | 1029.00 | 286.00 | ..... |

[fol. 314] 1932 Administration of Related Stream System in Washington by Harlow Barney, Water Master (Continued)

July 12 to 16—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 12 to 16:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 969.66 | ..... | ..... | 496.96 | 240.70 | ..... |

[fol. 315] 1933 Administration of Related Stream System in Washington by Harlow Barney, Water Master

July 8 to 12—All rights subsequent to 1904 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 9 to 12:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 455.10 | 150.28 | 535.71 | 253.80 | ..... | 14.30 |

July 12 to 16—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; and Walla Walla River above L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 12 to 16:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 558.47 | 71.66 | 376.30 | ..... | ..... | 123.00 |

July 18 to 22—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 18 to 22:

| Mill Creek | Garrison | Yellow-Hawk | W. W. River | West W. W. River | East W. W. River |
|---|---|---|---|---|---|
| 1217.36 | ..... | ..... | 1525.96 | 526.70 | ..... |

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[fol. 316] WASHINGTON EXHIBIT No. 28

[Title omitted]

Abstracts of Permits Nos. U-2, U-4, U-40, U-45, U-47, U-65 and U-68 Involving Water from Wells in the State of Oregon

(Here follow 7 photos, folios 317-323)

# Abstract of Permit No. U - 2

208A

*Application No.* U-2 *Certificate No.* 9102

*Name* Milton Nursery Company

*Address* Milton, Oregon.

*Source of water supply* A well, appr. 1½ mi. from Walla Walla River - Tum A Lum Branch tributary of Columbia River

*Use* Irrigation

*Point of diversion* NW¼NW¼SE¼, Section 31, Township 6 North, Range 36 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| No. | Range | Sec. | NE¼ | | | | NW¼ | | | | SW¼ | | | | SE¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| | 36 E | 31 | | | 30 | 10 | | | | 40 | 20 | 35 | 4 | | | 1 | | |

*Priority date* December 3, 1927.

*Amount of water* 1.75 cubic feet per second.

*Time limit to begin construction*

*Time limit to complete construction* *extended to*

*Time limit to completely apply water* *extended to*

*Remarks:*

2083

# Abstract of Permit No. U -4

*Application No.* U-4 *Certificate No.* 10085

*Name* C. H. Harris

*Address* Milton, Oregon

*Source of water supply* A well, tributary of Walla Walla River

*Use* Supplemental irrigation

*Point of diversion* SW¼SW¼, Section 27, Township 6 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE¼ | | | | NW¼ | | | | SW¼ | | | | SE¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| 6 N | 35 E | 27 | | | | | | | | | | | 30 | | | | | |

*Priority date* March 26, 1928;

*Amount of water* 0.38 cubic foot per second.

*Time limit to begin construction*

*Time limit to complete construction* *extended to*

*Time limit to completely apply water* *extended to*

*Remarks:*

# Abstract of Permit No. U - 40

2080

*Application No.* U-45 *Certificate No.*

*Name* O. I. Hittle

*Address* Freewater, Oregon

*Source of water supply* A well, tributary of Walla Walla River

*Use* Irrigation

*Point of diversion* SE¼SE¼SE¼, Section 23, Township 6 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE ¼ | | | | NW ¼ | | | | SW ¼ | | | | SE ¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| N | 35 E | 23 | | | | | | | | | | | | | | | | 20 |

*Priority date* December 15, 1930

*Amount of water* 0.25 cubic foot per second

*Time limit to begin construction* December 31, 1931

*Time limit to complete construction* October 1, 1932 *extended to*

*Time limit to completely apply water* October 1, 1933 *extended to* October 1, 1934

*Remarks:*

319

2080

# Abstract of Permit No. U - 45

*Application No.* U-52 *Certificate No.* 9757

*Name* C. H. Harris

*Address* Milton, Oregon

*Source of water supply* Well, tributary of Hudson Bay Ditch, tributary of Walla Walla River

*Use* irrigation

*Point of diversion* N½NW¼, Section 2, Township 5 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE¼ | | | | NW¼ | | | | SW¼ | | | | SE¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| 5 N | 35 E | 2 | | | | | | 10 | | | | | | | | | | |

*Priority date* March 7, 1931

*Amount of water* 0.12 cubic foot per second.

*Time limit to begin construction*

*Time limit to complete construction* *extended to*

*Time limit to completely apply water* *extended to*

320

*Remarks:*

# Abstract of Permit No. U - 47

*Application No.* U-54 *Certificate No.*

*Name* Phillip S. Gibbons, Sr. and Phillip S. Gibbons, Jr.

*Address* Freewater, Oregon

*Source of water supply* A well, tributary of Hudson Bay and Pleasantview canals

*Use* Irrigation

*Point of diversion* $NW\frac{1}{4}NW\frac{1}{4}$, Section 2, Township 5 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE ¼ | | | | NW ¼ | | | | SW ¼ | | | | SE ¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| N | 35 E | 2 | | | | | | 20 | | | | | | | | | | |

*Priority date* April 2, 1931

*Amount of water* 0.25 cubic foot per second

*Time limit to begin construction* May 29, 1932

*Time limit to complete construction* October 1, 1933 *extended to*

*Time limit to completely apply water* October 1, 1934 *extended to* 321

*Remarks:*

2081

# Abstract of Permit No. U - 65

*Application No.* U-74 *Certificate No.*

*Name* R. E. Heskett

*Address* Freewater, Oregon

*Source of water supply* a well, tributary of Walla Walla River

*Use* irrigation

*Point of diversion* SE¼NW¼NE¼, Section 33, Township 6 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE ¼ | | | | NW ¼ | | | | SW ¼ | | | | SE ¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| 6 N | 35 E | 33 | | 20 | | | | | | | | | | | | | | |

*Priority date* December 18, 1931

*Amount of water* 0.25 cubic foot per second

*Time limit to begin construction* March 3, 1933

*Time limit to complete construction* October 1, 1934 *extended to*

*Time limit to completely apply water* October 1, 1935 *extended to*

322

*Remarks:*

# Abstract of Permit No. U-68 2086

*Application No.* U-76 *Certificate No.*

*Name* Scott Redfearn

*Address* Freewater, Oregon

*Source of water supply* a well, tributary of Tumalum Branch of Walla Walla River

*Use* Irrigation

*Point of diversion* NE¼NW¼, Section 36, Township 6 North, Range 35 East, W. M.

*Name of ditch or reservoir*

**DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE**

| Twp. | Range | Sec. | NE ¼ | | | | NW ¼ | | | | SW ¼ | | | | SE ¼ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ | NE¼ | NW¼ | SW¼ | SE¼ |
| 6 N | 35 E | 36 | | | | | 8 | | | | | | | | | | | |

*Priority date* February 27, 1932

*Amount of water* 0.10 cubic foot per second

*Time limit to begin construction* May 16, 1933

*Time limit to complete construction* October 1, 1934 *extended to*

*Time limit to completely apply water* October 1, 1935 *extended to*

323

*Remarks:*

[fol. 324] WASHINGTON EXHIBIT No. 29

Tabulation of Approximately 80% of the Wells in the Related Area in Oregon, Giving Names of Operators, Location, Date Dug, Power Used for Pumping, and Other Data

NOTE.—The datum herein was secured by representatives of the State of Oregon and of the State of Washington, and is based upon inquiry from those thought to be best qualified to give the information sought. The dates set out are approximate only.

[fol. 325] I

According to Location

| Name | Location | Date Dug | Date Deepened | Power Used | | First Used |
|---|---|---|---|---|---|---|
| | | | | Gasoline | Electric | |
| R. C. Sheets | NW/NW | 1914 | | | 1914 | 1914 |
| R. C. Sheets | NW/NW | 1930 | | | 1930 | 1930 |
| Waggoner, Mr. | NW/NW | 1919 | | | 1919 | 1919 |
| Mr. Howton | NW/NW | 1918 | | | 1918 | 1918 |
| Mrs. John Clark | NW/NW | 1916 | | 1916 to 1918 | 1918 | 1916 |
| Harry Bets | NW/NW | 1923 | 1929 | 1923 to 1929 | 1929 | 1923 |
| George Massie | SE/NW | 1913 | | | 1913 | 1913 |
| F. S. Phelps | NE/NW | 1906 | 1914 | 1927 | 1927 | 1906 |
| Aaron Miller | SE/NW | 1929 | | | 1929 | 1929 |
| Ida Philips | SW/NW | 1934 | Not used yet | | | |
| Milton Nursery Co. | SE/NE | 1925 | | | 1925 | 1925 |
| | 2-5-35 | | | | | |
| E. J. McSherry | NE/NW | 1915 | | to 1931 | 1931 | 1915 |
| | 3-5-35 | | | | | |
| Bruce Shangle | NW/NW | 1921 | 1932 | | 1921 | 1921 |
| Bruce Shangle | NW/NW | 1918 | | | 1928 | 1928 |
| J. E. Irons | NE/NW | 1912 | 1931 | | 1912 | 1912 |
| N. W. Mumford | NE/NW | 1910 | | | 1910 | 1910 |
| Mrs. A. H. Carter | NW/NE | 1910 | | | | |
| Jack Dougherty | SW/NE | 1900 | | 1909 | | 1909 |
| John Ballot | SE/NW | 1917 | drilled 1931 | to 1927 | 1927 | 1917 |
| Conser Rhea | NW/SE | 1909 | | | 1909 | 1909 |
| C. L. Ringer | NE/NE | 1904 | | 1904 | | 1904 |
| | 31-6-36 | | | | | |
| Milton Nursery Co. | NW/NW/SE | 1930 | | | 1930 | 1930 |
| Anna Fields | NW/NW | 1910 | | 1910 | | 1910 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **36–6–36** | | | | | | |
| Ed Means | SW/SE | 1920 | drilled 1921 | to 1925 | 1925 | 1920 |
| W. M. Hayter | SE/SW | 1910 | 1926 | 1930 | 1930 | 1910 |
| Oberholtzer, Mr. | SE/NE | 1923 | | to 1928 | 1928 | 1923 |
| Martha Bostwick | NW/NE | 1923 | drilled 1930 | to 1930 | 1930 | 1923 |
| O. F. Hubbs | SW/NE | 1912 | drilled 1930 | to 1915 | 1930 | 1912 |
| Redfern Bros. | NE/NW | 1931 | Not used since dug. | | | |
| Millard Grogan | SW/NW | 1925 | drilled 1930 | to 1931 | 1931 | 1927 |
| **35–6–35** | | | | | | |
| W. W. Roeder | NW/NW | 1900 | drilled 1929 | | 1900 | 1900 |
| W. F. Eiffert | NW/NW | 1913 | 1928 | to 1916 | 1916 | 1913 |
| C. H. Harris | SW/SW | 1910 | | | 1910 | 1910 |
| [fol. 327] | | | | | | |
| C. H. Harris | SW/SW | 1910 | | | 1910 | 1910 |
| C. H. Harris | SW/SW | 1930 | drilled 1930 | | 1930 | never used |
| C. H. Harris | SW/SW | 1927 | | | 1927 | 1927 |
| Dr. Montgomery | SW/SW | 1911 | | | 1911 | 1911 |
| John Barnes | SW/SW | 1920 | | | 1922 | 1922 |
| W. C. Ownby | SW/SW | 1912 | 1932 | to 1914 | 1914 | 1912 |
| Otto Spragg | NW/SW | 1912 | Prior 1930 | | 1914 | 1914 |
| W. H. Coghill | SW/NW | 1916 | | to 1921 | 1921 | 1916 |
| C. H. Harris | SW/NW | 1916 | | | 1916 | 1916 |
| Dan Herndon | SW/NW | 1919 | 1930 | to 1921 | 1921 | 1919 |
| Karl Ganz | NW/NW | 1932 | Not used | | | |
| Alta Rogers | SW/NW | 1910 | 1916 | | 1910 | 1910 |
| Elba Rogers | SW/NE | 1923 | drilled 1925 | to 1925 | | 1923 |
| Elba Rogers | SW/NE | 1907 | drilled 1931 | to 1931 | 1931 | 1908 |
| Ivan Rogers | SW/NE | 1914 | | to 1918 | | 1914 |
| George Shortrige | SW/NE | 1920 | | to 1923 | | 1920 |
| John Roloff | NE/NE | 1912 | Never used | | | |
| Richenberg Est. | NW/NE | 1928 | 1931 | | 1928 | 1928 |
| T. O. Goodwin | NW/NE | 1914 | drilled 1931 | to 1925 | 1925 | 1914 |
| Alta Rogers | SW/NE | 1909 | 1927 | to 1927 | 1927 | 1909 |
| John McAuslin | SW/NE | 1908 | 1930 | to 1926 | 1926 | 1910 |

| Name | Location | Date Dug | Date Deepened | Power Used | | First Used |
|---|---|---|---|---|---|---|
| | | | | Gasoline | Electric | |
| | 35-6-35 (Continued) | | | | | |
| Clay Grogan | SE/SW | 1902 | 1926 | | 1926 | 1926 |
| W. A. Gent | SE/SW | 1903 | 1922 | to 1920 | 1920 | 1903 |
| | 34-6-35 | | | | | |
| Sam Brinker | NW/NW | 1922 | drilled 1923 | | 1922 | 1922 |
| John H. Brinker | NW/NW | 1925 | 1926 | | 1925 | 1925 |
| Lottie M. Knight | NE/NW | 1908 | | to 1910 | 1910 | 1908 |
| John H. Brinker | NW/NW | 1908 | | | 1908 | 1908 |
| J. A. Reese | NE/NW | Prior 1928 | 1931 | | 1928 | 1928 |
| Ned Feigner | NW/NE | 1914 | 1918 | | 1914 | 1914 |
| I. C. Jackson | NE/NE | 1912 | 1931 | | 1912 | 1912 |
| Roy Zent | SW/NW | 1920 | 1926 | to 1925 | 1925 | 1920 |
| Jacob Hess | NW/NW | 1922 | | | 1922 | 1922 |
| State of Oregon | SW/NW | 1908 | | | Now | 1908 |
| State of Oregon | SW/NW | 1922 | | | 1922 | 1922 |
| John H. Brinker | SW/NW | 1908 | 1928 | to 1924 | 1924 | 1908 |
| George H. Bishop | SW/SW | 1909 | | to 1917 | 1917 | 1909 |
| George H. Bishop | SW/SW | 1920 | | | 1920 | 1920 |
| Joe Dykes | NW/SW | 1916 | 1928 | to 1920 | 1920 | 1917 |
| Andrew Miller | NW/SW | 1917 | 1923 | to 1918 | 1918 | 1917 |
| Herman Saeger | SW/SW | 1914 | 1931 | | 1914 | 1914 |
| Geo. J. Henry Est. | NW/SW | 1914 | drilled 1928 | 1914 | | 1914 |
| Mrs. J. C. McKenzie | SE/SW | 1920 | 1926 | | 1920 | 1920 |
| Lawrence Divinick | SE/SW | 1921 | 1928 | | 1921 | 1921 |
| David Bier | SE/SW | 1909 | 1932 | | 1910 | 1910 |
| C. N. Rogers | SW/SE | 1913 | various times | | 1917 | 1917 |
| S. S. Shields | SE/SW | 1908 | 1924 | to 1912 | 1912 | 1908 |
| E. P. Jensen | SE/SE | 1908 | 1918 | | 1908 | 1908 |
| A. M. Leonard | SE/SE | 1920 | 1925 | to 1923 | 1923 | 1920 |

[fol. 328]

| | | | | | | |
|---|---|---|---|---|---|---|
| C. W. Darby | SE/SE | 1907 | | to 1911 | 1911 | 1907 |
| J. J. Cowart | SE/SE | 1916 | 1932 | to 1921 | 1921 | 1916 |
| J. H. Piper | NE/SE | 1907 | 1930 | | 1907 | 1907 |
| Groth Est. | NE/SE | 1909 | 1928 | | 1909 | 1909 |
| Gladys Delahaye | SE/NW | 1922 | | 1923 | 1923 | 1922 |
| N. W. King | SE/NW | 1923 | 1932 | to 1931 | 1931 | 1923 |
| Wm. Morris | SE/NW | 1910 | ? | | 1910 | 1910 |
| Wm. Morris | NE/SW | 1921 | | 1921 | | 1921 |
| Henry Graham | NE/NW | Prior 1913 | 1920 | | 1913 | ? |
| Carl Raugust | SW/NE | 1911 | 1929 | | 1911 | 1911 |
| Wm. Forsythe | SE/NE | 1899 | | 1901 to 1908 | 1908 | 1901 |
| Wm. Forsythe | SW/NE | 1909 | | | 1909 | 1909 |
| A. Feigner | SE/NE | 1910 | | | 1911 | 1911 |
| Wm. Forsythe | SW/NE | 1922 | 1925 | | 1922 | 1922 |
| Wm. Forsythe | SW/NE | 1926 | | | 1926 | 1926 |
| A. Feigner | NW/NE | 1929 | drilled 1930 | | 1929 | 1929 |
| Henry Eiffert | NE/NE | 1910 | | | 1910 | 1910 |
| A. Feigner | NW/NE | 1927 | | | 1927 | 1927 |
| C. N. Snow | NE/NE | 1928 | | | 1928 | 1928 |
| Herbert Tanke | NW/SE | 1920 | 1924 | | 1920 | 1920 |
| W. G. Hufford | SE/SE | 1919 | | | 1919 | 1919 |
| S. S. Shields | SW/SE | 1920 | 1925 | | 1925 | 1920 |
| Mr. C. J. McKenzie | SE/SW | 1931 | 1932 | | 1931 | 1931 |
| E. R. Rice | SW/SE | 1909 | 1928 | to 1917 | 1917 | 1909 |

33-6-35

| | | | | | | |
|---|---|---|---|---|---|---|
| W. R. Bookart | NE/NW | 1926 | drilled 1926 | 1926 | | 1926 |
| Mrs. Martha Ely | NW/NW | 1922 | 1924 | | 1922 | 1922 |
| C. O. Wheeler | SW/NW | 1923 | 1926 | | 1923 | 1923 |
| Howard Dunlap | SW/NW | 1922 | 1932 | | 1922 | 1922 |
| Farmers Brokerage Co. | NW/SW | 1921 | drilled 1921 | | 1921 | 1921 |
| Virgil Carter | NE/SW | 1915 | 1922 | to 1922 | 1922 | 1915 |
| Farmers Brokerage Co. | NW/SW | 1921 | drilled 1921 | | 1921 | 1921 |
| Art Redfern | SE/NW | 1920 | drilled 1930 | | 1920 | 1920 |
| Catherine Potts | NE/SW | 1922 | drilled 1923 | | 1922 | 1922 |

| Name | Location | Date Dug | Date Deepened | Power Used | | First Used |
|---|---|---|---|---|---|---|
| | | | | Gasoline | Electric | |
| | 34-6-35 | | | | | |
| | (Continued) | | | | | |
| Joe Piscallio | SE/NW | 1912 | drilled 1928 | | 1912 | 1912 |
| H. Clovis | NE/SW | 1919 | drilled 1924 | | 1919 | 1919 |
| W. W. Wasser | NW/SE | 1909 | 1927 | to 1927 | 1927 | 1909 |
| W. W. Wasser | NW/SE | 1914 | 1927 | | 1914 | 1914 |
| Mrs. May Vincent | NW/SE | 1919 | 1927 | to 1920 | 1920 | 1919 |
| T. A. Williams | SW/NE | 1922 | 1930 | | 1927 | 1922 |
| Hattie Robison | NE/SE | 1918 | 1925 | | 1918 | 1918 |
| Shields Fruit Co. | SE/SE | 1909 | 1924 | | 1909 | 1909 |
| Shields Fruit Co. | NE/SE | 1909 | drilled 1924 | to 1924 | 1924 | 1909 |
| Shields Fruit Co. | NE/SE | 1912 | drilled 1924 | | 1912 | 1912 |
| John McEwan | SE/SE | 1910 | 1925 & 1930 | | 1910 | 1910 |
| H. S. Shangle | SW/SE | 1920 | | | 1920 | 1920 |
| H. S. Shangle | SE/SW | 1915 | | | 1915 | 1915 |
| Carl Ulbricht | SE/NE | 1913 | | | 1913 | 1913 |
| C. P. Collins | SE/NW | Prior 1923 | drilled 1928 | | 1928 | 1923 |
| W. V. Staley | SE/NE | 1908 | 1913 | | 1919 | 1919 |
| Edith Halsey | SE/NE | 1922 | drilled 1933 | | 1922 | 1922 |
| N. A. Davis | NE/NE | 1932 | 1932 | | 1932 | 1932 |
| [fol. 329] | | | | | | |
| | 32-6-35 | | | | | |
| Farmers Brokerage Co. | SE/NE | 1931 | | | 1931 | 1931 |
| | 30-6-35 | | | | | |
| M. F. Hubbs | SW/SW | 1931 | | | 1932 | 1910 |
| Henry Grogan | SW/SW | 1910 | drilled 1930 | to 1930 | 1930 | 1910 |
| Dan Colley | SW/SW | 1910 | prior to 1930 | to 1930 | 1930 | 1910 |
| N. A. Heidenrich | NW/NW | drilled 1928 | | | 1928 | 1928 |

25-6-35

| | | | | | | |
|---|---|---|---|---|---|---|
| Mrs. C. L. Greer | SW/SE | prior to 1913 | | | 1913 | 1913 |
| Mary McCoy | SE/NE | 1920 | | 1920 | | 1920 |
| H. M. Williams | NE/NW | 1918 | drilled 1925 | | 1925 | 1925 |
| D. Goodwin | NW/NE | 1923 | | to 1932 | 1932 | 1924 |
| T. A. Town | NE/NW | 1916 | 1929 | 1916 | | 1916 |
| D. Goodwin | NW/NE | prior to 1914 | drilled 1931 | to 1931 | 1931 | 1914 |
| Mrs. Mike Barth | SE/NW | 1932 | drilled 1932 | | 1932 | 1932 |
| Louis Keen | SE/NW | prior to 1918 | drilled 1929 | | 1918 | 1918 |
| W. A. Harshfield | NE/SW | 1921 | | to 1925 | 1925 | 1921 |
| Alex Duff | SE/NW | drilled 1925 | | 1925 | | 1925 |
| J. P. Tolen | NW/SW | 1908 | drilled 1916 | to 1912 | 1912 | 1908 |
| Alex Duff | SW/NW | 1921 | drilled 1923 | | 1921 | 1921 |
| Val Hoffman | NE/SW | 1916 | | | 1916 | 1916 |
| L. P. Petty | NE/SW | 1918 | | | 1918 | 1918 |
| Mrs. Ruth Smith | NW/SW | prior to 1923 | 1925 & 1927 | to 1928 | 1928 | 1924 |
| U. H. Hayden | SE/SW | prior to 1915 | drilled 1930 | to 1925 | 1925 | 1919 |
| P. S. Broewer | SE/SW | 1916 | 1917 | 1916 | | 1916 |
| Jerome Hill | SW/SW | 1916 | 1931 | 1917 | | 1917 |
| Roy Records | SW/SW | 1919 | 1919 | 1919 | | 1919 |
| J. L. Blanchard | NW/SW | 1911 | 1928 | | 1911 | 1911 |
| S. J. Bowman | NW/SW | 1920 | 1929 | | 1920 | 1920 |
| Joe Bono | NE/NW | drilled 1929 | | | 1930 | 1930 |
| N. F. Cole | NW/NW | drilled 1929 | | | 1930 | 1930 |
| N. Clearkin | NW/NW | drilled 1929 | | | 1930 | 1930 |
| M. J. Bentley | NW/NW | 1926 | drilled 1930 | | 1931 | 1931 |
| Mrs. Howell | NW/NW | 1920 | | | 1920 | 1920 |
| George Ransom | SW/NW | 1926 | drilled 1930 | | 1926 | 1926 |
| H. D. Starkel | SE/SE | drilled 1926 | | to 1930 | 1930 | 1926 |
| W. S. Grogan | SE/SE | drilled 1926 | 1930 | to 1928 | 1928 | 1927 |

[fol. 330]

| | | | | | | |
|---|---|---|---|---|---|---|
| A. L. Coffey | NE/SE | 1910 | 1930 | | 1910 | 1910 |
| Issiac Hartzell | NW/SW | 1916 | | | 1916 | 1916 |
| A. E. Hull | SE/NE | 1906 | drilled 1930 | 1906 | | 1906 |

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| Name | Location | Date Dug | Date Deepened | Power Used | | First Used |
|---|---|---|---|---|---|---|
| | | | | Gasoline | Electric | |
| **26–6–35** | | | | | | |
| C. E. Anderson | NE/NE | 1916 | drilled 1920 | to 1926 | 1926 | 1916 |
| I. N. Ransom | SE/NE | 1910 | drilled 1926 | | 1910 | 1910 |
| J. J. Williams | NE/NE | 1908 | drilled 1920 | to 1919 | 1919 | 1908 |
| I. W. Treanor | NE/NE | 1928 | | | 1929 | 1929 |
| Edyth Didion | NE/NE | 1914 | 1930 | | 1914 | 1914 |
| M. G. Bently | NW/NE | 1910 | drilled 1930 | | 1928 | 1928 |
| F. C. Parr | NW/NE | 1908 | 1912 & 1913 | 1908 | | 1908 |
| F. C. Parr | NW/NE | 1918 | | 1918 | | 1918 |
| Fred McElrath | NE/NW | 1904 | drilled 1932 | to 1932 | 1932 | 1904 |
| Frank Derrick | SW/SW | 1929 | drilled 1930 | | 1929 | 1929 |
| M. Cook | SW/SW | 1931 | Being completed, Permit Well | | | |
| Orville Bowers | SW/NW | 1912 | drilled 1921 | | 1912 | 1912 |
| Jennie Brooks | SW/NW | 1906 | drilled 1929 | to 1929 | 1929 | 1906 |
| George Wharton | NE/SW | 1906 | | ? | ? | 1906 |
| Farm Brokerage Co. | SE/NW | 1904 | drilled 1920 | to 1920 | 1920 | 1904 |
| A. Avey | SE/NW | 1900 | 1926 | to 1926 | 1926 | 1900 |
| Broestler, Mr. | NE/NW | 1914 | drilled 1916 | | 1914 | 1914 |
| Chas. Walden | NE/SW | 1890 | 1925 & 1926 | | 1926 | 1926 |
| Henry Shackleford | SE/SW | 1905 | 1930 | | 1926 | 1905 |
| A. C. Franklin | SW/NE | 1902 | 1931 | | 1931 | 1931 |
| C. F. Otto | SW/NW | 1915 | drilled 1915 | to 1930 | 1930 | 1915 |
| W. A. Propeck | NE/SW | 1904 | 1930 | to 1930 | 1930 | 1904 |
| W. A. Propeck | SW/SE | 1914 | 1924 & 1931 | to 1924 | 1924 | 1914 |
| J. J. Knight | SW/SW | 1928 | drilled 1930 | to 1931 | 1931 | 1928 |
| Otto Jackel | SE/SE | 1890 | 1930 | to 1930 | 1930 | 1930 |
| J. A. Hughes | SW/SE | 1915 | drilled 1931 | | 1915 | 1915 |
| **27–6–35** | | | | | | |
| Chas. Schwald | SE/NE | 1913 | 1918 | to 1921 | 1921 | 1913 |
| John F. Pitman | NE/SW | 1911 | drilled 1930 | | 1913 | 1913 |

| | | | | | | |
|---|---|---|---|---|---|---|
| C. M. Bixby | NW/NW | 1912 | | | 1912 | 1912 |
| Jack Irons | NE/SW | 1923 | drilled 1923 | | 1923 | 1923 |
| R. S. Bixby | NE/SW | 1920 | | | 1920 | 1920 |
| Ed Lefor | NW/SW | 1909 & 1910 | 1920 | 1920 | to 1920 | 1910 |
| C. H. Harris | SW/SW | 1910 | drilled 1930 | | 1910 | 1910 |
| C. H. Harris | SW/SW | drilled 1927 | | | 1927 | 1927 |
| G. E. Allen | SE/SW | 1909 | 1930 | | 1909 | 1909 |
| G. F. Bline | SE/SW | prior 1913 | 1930 | | 1913 | prior 1913 |
| Tassie Stewart | Refused to give any information | | | | | |
| Frank McSherry | SW/SE | 1922 | 1930 & 1931 | | 1922 | 1922 |
| Frank Derrick | SE/SE | 1912 | | | 1912 | 1912 |
| Mrs. Anna Sargent | SE/SE | 1921 | drilled 1923 | | 1921 | 1921 |
| George Wilson | SE/SE | 1920 | | to 1930 | 1930 | 1920 |
| Wm. Roth | NE/SE | 1913 | drilled 1918 | to 1921 | 1921 | 1913 |
| Mrs. J. F. Slover | NW/SE | 1910 | | | 1910 | 1910 |
| Tassie Stewart | NW/SE | 1920 | | | 1920 | 1920 |
| Tassie Stewart | NW/SE | 1920 | | | 1920 | 1920 |
| G. F. Bline | SE/SW | 1924 | 1930 | | 1924 | 1924 |

[fol. 331]

28-6-35

| | | | | | | |
|---|---|---|---|---|---|---|
| Walter J. Rand | SE/NE | 1931 | drilled 1932 | 1933 | | 1933 |
| Walter J. Rand | SE/NE | 1931 | | 1931 | | 1931 |
| J. H. Barrie | NE/SE | 1921 | 1930 | to 1930 | 1930 | 1921 |
| J. N. Hanson | SE/SE | 1914 | drilled 1929 | | 1914 | 1914 |
| J. N. Hanson | SE/SE | 1922 | drilled 1922 | | 1922 | 1922 |

29-6-35

| | | | | | | |
|---|---|---|---|---|---|---|
| W. S. Edwards | NE/SE | 1926 | | | 1926 | 1926 |
| L. R. Edwards | NW/SE | 1909 | 1933 | | 1909 | 1909 |
| R. E. Edwards | SW/NE | 1933 | 1933 | | 1933 | 1933 |
| R. E. Hockett | NE/NE | 1917 | drilled 1927 | to 1924 | 1924 | 1917 |
| Henry Rouse | NW/NE | 1917 | drilled 1930 | | 1917 | 1917 |
| Henry Rouse | NW/NE | 1932 | Not used. | | | |

| Name | Location | Date Dug | Date Deepened | Power Used: Gasoline | Power Used: Electric | First Used |
|---|---|---|---|---|---|---|
| | 24-6-35 | | | | | |
| Everett S. Miller | SW/SE | 1923 | drilled 1925 & 1931 | to 1928 | 1928 | 1923 |
| | 21-6-35 | | | | | |
| E. A. Waltz | SE/NE | 1921 | drilled 1923 | 1921 | | 1921 |
| Otto Benkhe | SE/NE | 1930 | 1931-1932-1930 | 1930 | | 1930 |
| A. C. Conrad | NW/NE | 1910 | 1911 | 1910 | 1911 | 1910 |
| Albert Olson | SW/NE | 1926 | drilled 1927 | | 1926 | 1926 |
| G. J. Haasch | SW/NE | 1926 | drilled 1927 | | 1926 | 1926 |
| John Bade | SW/NW | 1904 | 1914 | to 1905 | 1905 | 1904 |
| John Bade | SW/NW | 1929 | | 1929 | | 1929 |
| J. E. Alexander | SW/SW | 1929 | Not sufficient water to irrigate | | | |
| J. E. Alexander | SW/SW | 1931 | Not sufficient water to irrigate | | | |
| | 20-6-35 | | | | | |
| Wm. Jackson | SW/SE | 1919 | | | 1919 | 1919 |
| | 14-6-35 | | | | | |
| Conrad Miller | NE/SW | 1921 | 1923 | 1921 | | 1921 |
| | 16-6-35 | | | | | |
| Sarah West | NW/SE | 1934 | | Not completed | | |
| J. B. Rankin | NW/SE | 1930 | | 1930 | | 1930 |
| Chas. Rand | SE/SW | 1914 | | 1926 | to 1926 | 1914 |
| Chas. Rand | SE/SW | 1910 | | 1933 | | 1933 |

[fol. 332]

## II

## According to Date

## When First Dug

| Name | Year | Location |
|---|---|---|
| [fol. 333] | 1890 | |
| Otto Jackell | | 26-6-36 |
| Chas. Walden | | 26-6-35 |
| | 1899 | |
| William Forsythe | | 34-6-35 |
| | 1900 | |
| A. Avey | | 26-6-35 |
| W. W. Roeder | | 35-6-35 |
| Jack Dougherty | | 3-5-35 |
| | 1901 | |
| | None | |
| | 1902 | |
| A. C. Franklin | | 26-6-35 |
| Clay Grogan | | 35-6-35 |
| | 1903 | |
| W. A. Gent | | 35-6-35 |
| [fol. 334] | 1904 | |
| C. L. Ringer | | 3-5-35 |
| John Bade | | 29-6-35 |
| Fred McElrath | | 26-6-35 |
| W. A. Propeck | | 26-6-35 |
| Farmers Brokerage Co. | | 26-6-35 |
| | 1905 | |
| Henry Shackleford | | 26-6-35 |
| | 1906 | |
| F. G. Phelps | | 1-5-35 |
| Jenny Brooks | | 26-6-35 |
| George Wharton | | 26-6-35 |
| A. E. Hull | | 26-6-35 |
| | 1907 | |
| Elba Rogers | | 35-6-35 |
| G. W. Darby | | 34-6-35 |
| J. H. Piper | | 34-6-35 |

| Name | Year | Location |
|---|---|---|
| | 1908 | |
| John McAuslin | | 35-6-35 |
| Lottie McKnight | | 34-6-35 |
| John H. Brinker (N. W./N. W.) | | 34-6-35 |
| State of Oregon | | 34-6-35 |
| John Brinker (S. W./N. W.) | | 34-6-35 |
| S. S. Shields | | 34-6-35 |
| E. P. Jensen | | 34-6-35 |
| W. V. Staley | | 33-6-35 |
| J. G. Tolen | | 33-6-35 |
| F. C. Parr | | 26-6-35 |
| J. J. Williams | | 26-6-35 |
| [fol. 335] | 1909 | |
| Ed Lefor | | 27-6-35 |
| G. E. Allen | | 27-6-35 |
| Alta Rogers | | 35-6-35 |
| Conser Rhea | | 3-5-35 |
| William Forsythe | | 34-6-35 |
| Geo. H. Bishop | | 34-6-35 |
| David Bier | | 34-6-35 |
| Groth Est. | | 34-6-35 |
| L. P. Edwards | | 29-6-35 |
| W. W. Wasser | | 33-6-35 |
| Shields Fruit Co. | | 33-6-35 |
| Shields Fruit Co. | | 33-6-35 |
| E. R. Rice | | 34-6-35 |
| | 1910 | |
| C. H. Harris | | 27-6-35 |
| J. F. Slover | | 27-6-35 |
| C. H. Harris | | 35-6-35 |
| C. H. Harris | | 35-6-35 |
| Alta Rogers | | 35-6-35 |
| W. M. Hayter | | 36-6-35 |
| Anna Fields | | 31-6-36 |
| N. W. Mumford | | 3-5-35 |
| A. H. Carter | | 3-5-35 |
| William Morris | | 34-6-35 |
| A. Feigner | | 34-6-35 |
| Henry Eiffert | | 34-6-35 |
| A. C. Conrad | | 21-6-35 |
| Chas. Rand | | 21-6-35 |

| Name | Year | Location |
|---|---|---|
| John McEwan | | 33-6-35 |
| Henry Grogan | | 30-6-35 |
| Dan Colley | | 30-6-35 |
| F. W. Ransom | | 26-6-35 |
| A. L. Colley | | 26-6-35 |
| W. G. Bently | | 26-6-35 |
| | 1911 | |
| Dr. Montgomery | | 35-6-35 |
| John F. Pitman | | 27-6-35 |
| Carl Raugust | | 34-6-35 |
| J. L. Blanchard | | 25-6-35 |
| [fol. 336] | 1912 | |
| W. C. Ownby | | 35-6-35 |
| Otto Spragg | | 35-6-35 |
| John Roloff | | 35-6-35 |
| J. E. Irons | | 3-5-35 |
| O. F. Hubbs | | 26-6-35 |
| C. M. Bixby | | 27-6-35 |
| Frank Derrick | | 27-6-35 |
| I. C. Jackson | | 34-6-35 |
| Joe Piscallio | | 33-6-35 |
| Shields Fruit Co. | | 33-6-35 |
| Orville Bowers | | 26-6-35 |
| | 1913 | |
| W. F. Eiffert | | 35-6-35 |
| George Massie | | 1-5-35 |
| Charles Schwald | | 27-6-35 |
| G. F. Bline | | 27-6-35 |
| C. N. Rogers | | 34-6-35 |
| Henry Graham | | 34-6-35 |
| Carl Ulbricht | | 33-6-35 |
| Mrs. C. L. Grier | | 25-6-35 |
| Wm. Roth | | 27-6-35 |
| | 1914 | |
| Ivan Rogers | | 35-6-35 |
| R. C. Sheets | | 1-5-35 |
| J. N. Hanson | | 28-6-35 |
| Ned Feignor | | 34-6-35 |
| Herman Saager | | 34-6-35 |
| Geo. Henry Est. | | 34-6-35 |

| Name | Year | Location |
|---|---|---|
| W. W. Wasser | | 33-6-35 |
| Chas. Rand | | 21-6-35 |
| D. Goodwin | | 25-6-35 |
| Edyth Dideon | | 26-6-35 |
| Mr. Broestler | | 26-6-35 |
| W. A. Propeck | | 26-6-35 |
| T. O. Goodwin | | 35-6-35 |
| | 1915 | |
| E. J. McSherry | | 2-5-35 |
| C. F. Otto | | 26-6-35 |
| J. A. Hughes | | 26-6-35 |
| U. H. Hayden | | 25-6-35 |
| Virgil Carter | | 33-6-35 |
| H. S. Shangle | | 33-6-35 |
| [fol. 337] | 1916 | |
| Joe Dykes | | 34-6-35 |
| J. J. Cowart | | 34-6-35 |
| W. H. Coghill | | 34-6-35 |
| C. H. Harris | | 35-6-35 |
| Mrs. John Clark | | 1-5-35 |
| T. A. Town | | 25-6-35 |
| Val Hoffman | | 25-6-35 |
| P. S. Broewer | | 25-6-35 |
| Jerome Hill | | 25-6-35 |
| Issiac Hartzell | | 26-6-35 |
| C. E. Anderson | | 26-6-35 |
| | 1917 | |
| Andrew Miller | | 34-6-35 |
| John Balliot | | 3-5-35 |
| R. E. Heskett | | 29-6-35 |
| Henry Rouse | | 29-6-35 |
| | 1918 | |
| Bruce Shangle | | 3-5-35 |
| Louis Howton | | 1-5-35 |
| H. M. Williams | | 25-6-35 |
| Louis Keen | | 25-6-35 |
| L. R. Petty | | 25-6-35 |
| F. C. Parr | | 26-6-35 |
| Hattie Robinson | | 33-6-35 |

| Name | Year | Location |
|---|---|---|
| | 1919 | |
| W. G. Hufford | | 34-6-35 |
| Dan Herndon | | 35-6-35 |
| Mr. Waggoner | | 1-5-35 |
| Wm. Jackson | | 20-6-35 |
| Roy Records | | 25-6-35 |
| H. Clovis | | 33-6-35 |
| Mrs. May Vincent | | 33-6-35 |
| | 1920 | |
| Ed. Means | | 36-6-35 |
| John Barnes | | 35-6-35 |
| George Shortridge | | 35-6-35 |
| Herbert Tanke | | 34-6-35 |
| Roy Zent | | 34-6-35 |
| [fol. 338] Geo. H. Bishop | | 34-6-35 |
| Mrs. J. C. McKenzie | | 34-6-35 |
| A. M. Leonard | | 34-6-35 |
| R. S. Bixby | | 27-6-35 |
| George Wilson | | 27-6-35 |
| Tassie Stewart | | 27-6-35 |
| Tassie Stewart | | 27-6-35 |
| Art Redfern | | 33-6-35 |
| H. S. Shangle | | 33-6-35 |
| Mary McCoy | | 25-6-35 |
| S. J. Bowman | | 25-6-35 |
| Mrs. Howell | | 25-6-35 |
| George Shortridge | | 35-6-35 |
| | 1921 | |
| Bruce Shangle | | 3-5-35 |
| J. H. Barnes | | 28-6-35 |
| Lawrence Divinick | | 34-6-35 |
| William Morris | | 34-6-35 |
| Conrad Miller | | 14-6-35 |
| Farmers Brokerage Co. | | 33-6-35 |
| Farmers Brokerage Co. | | 33-6-35 |
| E. A. Waltz | | 21-6-35 |
| W. A. Harshfield | | 25-6-35 |
| Alex Duff | | 25-6-35 |
| Mrs. Anna Sargent | | 27-6-35 |
| | 1922 | |
| Fred McSherry | | 27-6-35 |
| J. N. Hanson | | 28-6-35 |

| Name | Year | Location |
|---|---|---|
| Sam Brinker | | 34-6-35 |
| Jacob Hess | | 34-6-35 |
| State of Oregon | | 34-6-35 |
| Gladys Delahaye | | 34-6-35 |
| William Forsythe | | 34-6-35 |
| Mrs. Martha Eby | | 33-6-35 |
| Howard Danlop | | 33-6-35 |
| Catherine Potts | | 33-6-35 |
| T. A. Williams | | 33-6-35 |
| Edith Halsey | | 33-6-35 |
| | 1923 | |
| Jack Irons | | 27-6-35 |
| N. V. King | | 34-6-35 |
| Harry Betz | | 1-5-35 |
| Martha Bostwick | | 36-6-35 |
| Mr. Oberholtzer | | 36-6-35 |
| Elba Rogers | | 35-6-35 |
| Everett Miller ; | | 24-6-35 |
| C. D. Wheeler | | 33-6-35 |
| C. P. Collins | | 33-6-35 |
| D. Goodwin | | 25-6-35 |
| Mrs. Ruth Smith | | 25-6-35 |
| [fol. 339] | 1924 | |
| G. F. Bline | | 27-6-35 |
| | 1925 | |
| John H. Brinker | | 34-6-35 |
| Milton Nursery Co. | | 1-5-35 |
| William Grogan | | 36-6-35 |
| Alex Duff | | 25-6-35 |
| | 1926 | |
| William Forsythe | | 34-6-35 |
| H. R. Bookart | | 33-6-35 |
| Albert Olsen | | 21-6-35 |
| G. J. Haasch | | 21-6-35 |
| W. S. Edwards | | 29-6-35 |
| M. J. Bently | | 25-6-35 |
| George Ransom | | 25-6-35 |
| H. D. Starkel | | 25-6-35 |
| W. G. Grogan | | 25-6-35 |

| Name | Year | Location |
|---|---|---|
| | 1927 | |
| C. H. Harris | | 35-6-35 |
| C. H. Harris | | 27-6-35 |
| A. Feigner | | 34-6-35 |
| | 1928 | |
| Rickenburg Est. | | 35-6-35 |
| J. A. Reese | | 34-6-35 |
| M. A. Heidenrich | | 30-6-36 |
| I. W. Treanor | | 26-6-35 |
| J. J. Knight | | 26-6-35 |
| | 1929 | |
| A. Feigner | | 34-6-35 |
| Aaron Miller | | 1-5-35 |
| John Bade | | 21-6-35 |
| J. E. Alexander | | 21-6-35 |
| Joe Bono | | 25-6-35 |
| N. P. Cole | | 25-6-35 |
| N. Clearken | | 25-6-35 |
| Frank Derrick | | 26-6-35 |
| [fol. 340] | 1930 | |
| R. C. Sheets | | 1-5-35 |
| Otto Benkhe | | 21-6-36 |
| J. B. Rankin | | 16-6-35 |
| Milton Nursery Co. | | 31-6-36 |
| C. H. Harris | | 35-6-35 |
| | 1931 | |
| Mrs. C. J. McKenzie | | 34-6-35 |
| Walter Rand | | 28-6-35 |
| Walter Rand | | 28-6-35 |
| Redfern Bros. | | 36-6-35 |
| Farmers Brokerage Co. | | 32-6-35 |
| M. F. Hubbs | | 30-6-35 |
| M. Cook | | 26-6-35 |
| J. E. Alexander | | 21-6-35 |
| | 1932 | |
| Henry Rouse | | 29-6-35 |
| N. A. Davis | | 33-6-35 |
| Mrs. Mike Barth | | 25-6-35 |
| | 1933 | |
| R. E. Edwards | | 29-6-35 |
| | 1934 | |
| Ida Phillips | | 1-5-35 |
| Sarah West | | 16-6-35 |

[fol. 341] WASHINGTON EXHIBIT No. 30

[Title omitted]

Tables--Nos. I, II, IIa, III, IV, IVa, V, VI, VIa, VIb, and VII Showing Engineering Studies of the Walla Walla River

As Part of the Testimony of James G. Woodburn

[fol. 342]

Table I

Summer Monthly Mean Discharge in C. F. S. of Walla Walla River Near Confluence of North and South Forks

1918 to 1933

| Year | Station at which records were obtained | June | | July | | August | | September | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean Cfs. | Variation from Mean for period | Mean Cfs. | Variation from Mean for period | Mean Cfs. | Variation from Mean for period | Mean Cfs. | Variation from Mean for period |
| 1918 | 212 | 183 | − 48 | 129 | + 17 | 121 | + 21 | 128 | + 17 |
| 1919 | " | 200 | − 32 | 121 | + 9 | 109 | + 9 | 127 | + 16 |
| 1920 | " | 216 | − 16 | 112 | ... | 112 | + 12 | 118 | + 7 |
| 1921 | " | 236 | + 4 | 123 | + 11 | 110e | + 10 | 123 | + 12 |
| 1922 | " | 400 | +168 | 142 | + 30 | 132 | + 32 | 129 | + 18 |
| 1923 | " | 349 | +118 | 124 | + 12 | 95.7 | − 4 | 93.2 | − 18 |
| 1924 | " | 121 | −110 | 99.4 | − 12 | 98.7 | − 2 | 105 | − 6 |
| 1925 | " | 158 | − 74 | 100 | − 12 | 98.7 | − 2 | 105 | − 6 |
| 1926 | " | 103 | −128 | 80.6 | − 31 | 83.4 | − 17 | 105 | − 6 |
| 1927 | " | 287 | + 56 | 106 | − 6 | 88.7 | − 12 | 150 | + 39 |
| 1928 | " | 161 | − 70 | 110 | − 2 | 92.9 | − 7 | a | |
| 1930 | 215 & 216 | 185 | − 46 | 81.5 | − 30 | 82.2 | − 18 | 81.9 | − 29 |
| 1931 | " | 133 | − 98 | 83.1 | − 28 | 75.7 | − 24 | 78.5 | − 32 |
| 1932 | " | 300 | + 68 | 124 | + 12 | 96.4 | − 4 | 100 | − 11 |
| 1933 | " | 441 | +210 | 138 | + 26 | 106 | + 4 | 108 | − 3 |
| Total | | 3,473 | | 1,673.6 | | 1,502.4 | | 1,551.6 | |
| Mean | | 231.5 | | 111.6 | | 100.2 | | 110.8 | |
| Acre-ft | | 13,770 | | 6,860 | | 6,150 | | 6,810 | |

a Diversion for new Milton Power Plant apparently began in September, 1928.
e Estimated.

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[fol. 343] Table II

1933 Water Supply Conditions in Washington at 10-Day Intervals After Washington Rights Subsequent to 1892 of the Related Stream System Were Closed

| Source of water | July 22 cfs. | Aug. 1 cfs. | Aug. 11 cfs. | Aug. 21 cfs. | Aug. 31 cfs. |
|---|---|---|---|---|---|
| Mill Creek below Blue Creek | 34 | 33 | 36 | 36 | 35 |
| Return from City Reservoir* | 15 | 15 | 9 | 10 | 11 |
| Sewage | 5 | 5 | 5 | 5 | 5 |
| Springs contributing to Related Stream System | 16 | 16 | 15 | 15 | 15 |
| Flow across State Line | 22 | 18 | 18 | 17 | 18 |
| | 92 | 87 | 83 | 83 | 84 |
| Less Gardena Diversion | 34 | 32 | 28 | 21 | 28 |
| Available Supply | 58 | 55 | 55 | 62 | 56 |
| Indicated gross duty 1 cfs. to: | 94 acres | 99 acres | 99 acres | 88 acres | 97 acres |

Average 1 cfs. to 95 acres.

Duty based on irrigation rights by decree:

Prior to 1893:

| | | |
|---|---|---|
| Mill Creek | 1,347.37 | Acres |
| Garrison Creek | 478.14 | " |
| Yellowhawk Creek | 647.97 | " |
| East Little Walla Walla R. | 459.04 | " |
| West Little Walla Walla R. | 546.90 | " |
| Walla Wall River | 1,506.11 | " |
| Total | 4,985.53 | Acres |
| Subsequent to 1893: | | |
| Mill Creek | 472.93 | Acres |
| Total | 5,458.46 | Acres |

* This flow fluctuates greatly during the day, hence cannot be efficiently used for irrigation.

[fol. 344] Table IIa

Measured Flow of Springs in the Walla Walla Area in Washington Which Contribute to Related Stream System

| Spring Branch | Tributary To | Flow in Cfs. Aug. 13–16 1932 | Flow in Cfs. Oct. 3 1933 |
|---|---|---|---|
| Bryant Creek | Garrison | 1.24 | 1.77 |
| College-Boyer Creek | Mill | 0.67 | 0.58 |
| Coyle | Mill | 0.13 | 0.50 |
| Gordon-Maiden | W. L. W. W. | 2.62 | 2.98 |
| Lasater | Yellowhawk | .... | 0.26 |
| Lower Cold Creek | Mill | 1.90 | 1.83 |
| Shelton-Caldwell Creek | Yellowhawk | 1.20 | 0.85 |
| Stubblefield | Yellowhawk | 0.69 | 0.83 |
| Walsh Creek | W. L. W. W. | 1.06 | 1.61 |
| Whitney | Yellowhawk | 0.31 | 0.39 |
| | | 9.82 | 11.60 |
| Blue Mountain | W. W. R. | | |
| Average of 3 measurements in July and Aug. 1932 | | 1.53 | |
| July 14, 1933 | | .... | 1.92 |

| McEvoy | W. W. R. | |
|---|---|---|
| Average of 3 measurements in July and Aug. 1932 | 2.67 | .... |
| July-August average, 1933 | .... | 4.03 |
| Total | 14.02 | 17.55 |

[fol. 345]

Table III

1933 Water Supply Conditions on Part I of the Project in Oregon at 10-Day Intervals After Washington Rights Subsequent to 1892 on the Related Stream System Were Closed

| Source of Water | July 22 cfs. | Aug. 1 cfs. | Aug. 11 cfs. | Aug. 21 cfs. | Aug. 31 cfs. |
|---|---|---|---|---|---|
| South Fork Sta. 214 | 118 | 113 | 110 | 108 | 112 |
| North Fork Sta. 216 | 5 | 5 | 4 | 3 | 3 |
| Consumptive use on North Fork above Sta. 216 (Estimated) | 5 | 5 | 5 | 5 | 5 |
| Available Water | 128 | 123 | 119 | 116 | 120 |
| Indicated gross duty. 1 cfs. to: | 25 acres | 26 acres | 26 acres | 27 acres | 26 acres |

Average 1 cfs. to 26 acres

Duty based on irrigation rights by decree (through 1909) except Hudson Bay Co. and Couse Creek: Total 3,140.051 acres.

Source of Data in Table

South Fork Sta. 214: Data page 55.
North Fork Sta. 216: Data page 63.

Consumptive use on North Fork above Sta. 216: There are 193.6 acres on the North Fork above Sta. 216, which have water rights by decree. The decreed maximum rate of diversion is 7.28 cfs. The measured rate of all diversions on July 26, 1932 was 9.5 cfs., and on Aug. 25, 1933, was 10.0 cfs. There is, however, some gain by springs and seepage, part of which may be return flow from irrigation, so the consumptive use is estimated as about half of the amount diverted, or 5 cfs.

[fol. 346]

Table IV

Measured Oregon Diversions Above Center of Sections 26, 27, and 34, 1933

| No. | Name | Total Acres Served, by decree | Maximum allowable diversion by decree CFS | July Diversion Mean CFS | July Over Diversion Mean CFS | August Diversion Mean CFS | August Over Diversion Mean CFS |
|---|---|---|---|---|---|---|---|
| South Fork | | | | | | | |
| 17 | Poulsen | 8.80 | 0.33 | 2.36 | 2.03 | 2.03 | 1.70 |
| 18 | Hopkins | | | 6.77 | | 4.75 | |
| 19 | Rhuberg-Powell | 118.27 | 4.44 | 2.01 | 4.51 | 1.74 | 2.23 |
| 20 | Gray-Demaris | | | 0.17 | | 0.18 | |
| 22 | Dorothy | 87.40 | 3.28 | 1.75 | None | 2.23 | None |
| North Fork | | | | | | | |
| 37 | Bowlus | 57.60 | 2.16 | 3.09 | 0.93 | 2.31 | 0.15 |
| Walla Walla River | | | | | | | |
| 24 | Demaris | 81.10 | 3.04 | 4.29 | 1.25 | 3.18 | 0.14 |
| 40 | Spence | 123.18 | 4.62 | 4.67 | 0.05 | 4.10 | None |
| 42 | Zell | 81.52 | 3.07 | 4.55 | 1.48 | 3.57 | 0.50 |
| Totals above Milton | | 557.87 | 20.94 | 29.66 | 10.25 | 24.09 | 4.72 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 57 | Milton | 330.92 | 13.23 | 15.38 | 2.15 | 15.35 | 2.12 |
| | Tum-a-lum | 37.17 | 1.40 | 2.6 | 1.20 | 1.94 | 0.54 |
| | East Side | 260.22 | 11.03 | 13.19 | 2.16 | 12.50 | 1.47 |
| Little Walla Walla River | | | | | | | |
| | Stillman | 79.75 | 3.19 | 5.06 | 1.87 | 4.83 | 1.64 |
| | Perkins | 43.276 | 2.49 | 3.0 | 0.51 | 2.88 | 0.39 |
| | E. Crockett | 222.98 | 8.36 | 10.71 | 2.35 | 10.77 | 2.41 |
| | W. Crockett | 334.91 | 12.59 | 14.13 | 1.54 | 13.86 | 1.27 |
| | Ford | 503.02 | 18.88 | 20.42 | 1.54 | 18.45 | None |
| | Powell-P. V. | 217.15 | 8.17 | 9.8 | 1.63 | 8.4 | 0.23 |
| Totals from Milton | | 2,029.396 | 79.34 | 94.29 | 14.95 | 88.98 | 10.07 |
| Totals | | 2,587.266 | 100.28 | 123.95 | 25.20 | 113.07 | 14.79 |

[fol. 347] Table IVa

Measured Diversions on Part 2 of the Project in Oregon

| Name | Acres | Maximum allowable diversion CFS | Part of July | | August | |
|---|---|---|---|---|---|---|
| | | | Diversion Mean CFS | Over Diversion Mean CFS | Diversion Mean CFS | Over Diversion Mean CFS |
| A. Including all rights prior to 1909 | | | | | | |
| Wells ditch | 167.18 | 6.27 | 6.96 | 0.69 | 5.78 | .... |
| West Prong[1] | 375.74 | 7.85 | 6.91 | .... | 4.66 | .... |
| Totals | 542.92 | 14.12 | 13.87 | .... | 10.44 | .... |
| B. Including all rights prior to 1893. | | | | | | |
| Wells ditch | 163.18 | 6.12 | 6.96 | 0.84 | 5.78 | .... |
| West Prong[1] | 117.29 | 2.81 | 6.91 | 4.10 | 4.66 | 1.85 |
| Totals | 280.47 | 8.93 | 13.87 | 4.94 | 10.44 | 1.85 |

[1] Between SW¼ NE¼ Section 22 and State Line.

[fol. 348] Table V

1933 Water Supply Conditions on Part 2 of the Project in Oregon at 10-Day Intervals After Washington Rights Subsequent to 1892 on the Related Stream System Were Closed

| Source of Water | July 22 cfs. | Aug. 1 cfs. | Aug. 11 cfs. | Aug. 21 cfs. | Aug. 31 cfs. |
|---|---|---|---|---|---|
| Big Spring Branch at Crigler's | 10 | 9 | 8 | 8 | 8 |
| Ballou Spring Branch in NW/NE Sect. 23 plus diversion therefrom in NW/SE Sect. 23 | 5 | 5 | 5 | 5 | 5 |
| East Prong Spring Branch at Wells intake | 8 | 7 | 6 | 7 | 7 |
| West Prong Spring Branch at SW/NE Sect. 22. | 10 | 8 | 8 | 6 | 6 |
| | 33 | 29 | 27 | 26 | 26 |
| Less State Line Flow | 15 | 13 | 12 | 12 | 13 |
| Water Used | 18 | 16 | 15 | 14 | 13 |
| Indicated gross duty 1 cfs. to: | 63 acres | 71 acres | 65 acres | 82 acres | 88 acres |

Duty based on irrigation rights through 1909 between points of measurement and state line:

| | | |
|---|---|---|
| By decreee: | | |
| Big Spring Branch | 121.55 | acres |
| L. W. W. (Ballou) Spring Branch | 189.30 | " |
| East Prong (Welis Ditch) | 169.18 | " |
| West Prong | 375.74 | " |
| Total by decree | 855.77 | " |
| By permits: | | |
| Big Spring Br. (Grandview) | 288.00 | " |
| Total | 1,143.77 | acres |

Source of Data in Table

Big Spring at Criglers: Data page 153.
Ballou Spring Branch: Data pages 150 and 151.
East Prong: Data pages 157 and 165.
West Prong: Data page 158.
State Line: Data pages 77–101.

[fol. 349] Table VI

Summary

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1933

| | July 22 | Aug. 1 | Aug. 11 | Aug. 21 | Aug. 31 |
|---|---|---|---|---|---|
| 1 Oregon rate of use: | | | | | |
| Maximum by decree | | | | | |
| Available surplus in cfs | 44 | 38 | 34 | 31 | 35 |
| Gardena shortage | 22 | 24 | 28 | 35 | 28 |
| Remainder for distribution | 22 | 14 | 6 | ..... | 7 |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 614 | 383 | 54 | ..... | 71 |
| Oregon | 485 | 309 | 143 | ..... | 166 |
| Total | 1,099 | 692 | 197 | ..... | 237 |
| Resulting increase in flow across State Line—cfs | 28 | 28 | 29 | 31 | 29 |
| 2. Oregon rate of use: | | | | | |
| 1¼ miners in. per acre. | | | | | |
| Available surplus in cfs | 59 | 52 | 47 | 44 | 48 |
| Gardena shortage in cfs | 22 | 24 | 28 | 35 | 28 |
| Remainder for distribution | 37 | 28 | 19 | 9 | 20 |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 1,179 | 1,017 | 601 | 223 | 628 |
| Oregon | 950 | 661 | 473 | 236 | 499 |
| Total | 2,129 | 1,678 | 1,074 | 459 | 1,127 |
| Resulting increase in flow across State Line—cfs | 34 | 34 | 34 | 37 | 34 |
| 3. Oregon rate of use: | | | | | |
| 1 miners in. per acre. | | | | | |
| Available surplus in cfs | 73 | 66 | 61 | 57 | 60 |
| Gardena shortage in cfs | 22 | 24 | 28 | 35 | 28 |
| Remainder for distribution | 51 | 42 | 33 | 22 | 32 |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 1,385 | 1,361 | 1,182 | 816 | 1,167 |
| Oregon | 1,330+ | 1,261 | 957 | 599 | 921 |
| Total | 2,715+ | 2,622 | 2,139 | 1,415 | 2,088 |
| Resulting increase in flow across State Line—cfs | 36 | 38 | 40 | 43 | 40 |
| Combined flow at Stations 214 and 216 | 123 | 118 | 114 | 111 | 115 |
| Flow of Mill Cr. below Blue Cr. | 34 | 33 | 36 | 36 | 35 |

[fol. 350]

## Table VIa

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1932

| | July 22 | Aug. 1 | Aug. 11 | Aug. 21 | Aug. 31 |
|---|---|---|---|---|---|
| 1. Oregon rate of use: | | | | | |
| Maximum by decree | | | | | |
| Available surplus in cfs | 37 | 34 | 25 | 17 | 22 |
| Gardena shortage | 19 | 28 | 43 | 35 | 36 |
| Remainder for distribution | 18 | 6 | ..... | ..... | ..... |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 515 | 54 | ..... | ..... | ..... |
| Oregon | 395 | 144 | ..... | ..... | ..... |
| Total | 910 | 198 | ..... | ..... | ..... |
| Resulting increase in flow across State Line | 24 | 29 | 25 | 17 | 22 |
| 2. Oregon rate of use: | | | | | |
| 1¼ miners in. per acre. | | | | | |
| Available surplus in cfs | 52 | 49 | 39 | 30 | 35 |
| Gardena shortage | 19 | 28 | 43 | 35 | 36 |
| Remainder for distribution | 33 | 21 | ..... | ..... | ..... |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 1,127 | 656 | ..... | ..... | ..... |
| Oregon | 831 | 524 | ..... | ..... | ..... |
| Total | 1,958 | 1,180 | ..... | ..... | ..... |
| Resulting increase in flow across State Line | 30 | 35 | 39 | 30 | 35 |
| 3. Oregon rate of use: | | | | | |
| 1 miners in. per acre. | | | | | |
| Available surplus in cfs | 66 | 63 | 53 | 43 | 49 |
| Gardena shortage | 19 | 28 | 43 | 35 | 36 |
| Remainder for distribution | 47 | 35 | 10 | 8 | 13 |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 1,385 | 1,226 | 338 | 234 | 481 |
| Oregon | 1,330+ | 1,023 | 288 | 241 | 363 |
| Total | 2,715+ | 2,249 | 626 | 475 | 844 |
| Resulting increase in flow across State Line | 33 | 40 | 46 | 37 | 41 |
| Combined flow at Stations 214 and 216 | 117 | 114 | 105 | 97 | 102 |
| Mill Creek below Blue Creek | 36 | 34 | 30 | 30 | 29 |

[fol. 351] Table VIb

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1931

| | July 1 | July 15 | Aug. 1 | Aug. 15 | Aug. 31 |
|---|---|---|---|---|---|
| 1. Oregon rate of use: | | | | | |
| Maximum by decree | | | | | |
| Available surplus in cfs | 19 | 11 | 3 | 5 | 3 |
| Gardena shortage | 6 | 31 | 51 | 51 | 51 |
| Remainder for distribution | 13 | ..... | ..... | ..... | ..... |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 338 | ..... | ..... | ..... | ..... |
| Oregon | 288 | ..... | ..... | ..... | ..... |
| Total | 626 | ..... | ..... | ..... | ..... |
| Resulting increase in flow across State Line | 9 | 11 | 3 | 5 | 3 |
| 2. Oregon rate of use: | | | | | |
| 1¼ miners in. per acre. | | | | | |
| Available surplus in cfs | 32 | 24 | 16 | 18 | 16 |
| Gardena shortage | 6 | 31 | 51 | 51 | 51 |
| Remainder for distribution | 22 | ..... | ..... | ..... | ..... |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 907 | ..... | ..... | ..... | ..... |
| Oregon | 609 | ..... | ..... | ..... | ..... |
| Total | 1,516 | ..... | ..... | ..... | ..... |
| Resulting increase in flow across State Line | 15 | 24 | 16 | 18 | 16 |
| 3. Oregon rate of use: | | | | | |
| 1 miners in. per acre. | | | | | |
| Available surplus in cfs | 43 | 35 | 27 | 29 | 27 |
| Gardena shortage | 6 | 31 | 51 | 51 | 51 |
| Remainder for distribution | 37 | 4 | ..... | ..... | ..... |
| Acres subsequent to 1892 which can be irrigated: | | | | | |
| Washington | 1,277 | 52 | ..... | ..... | ..... |
| Oregon | 1,086 | 139 | ..... | ..... | ..... |
| Total | 2,363 | 191 | ..... | ..... | ..... |
| Resulting increase in flow across State Line | 19 | 32 | 27 | 29 | 27 |
| Combined flow at Stations 214 and 216 | 99 | 91 | 83 | 85 | 83 |

[fol. 352] Table VII

Gain in Flow of the Walla Walla River in Washington

1933—State Line to Kennedy Bridge

| | | July Mean cfs. | August Mean cfs. |
|---|---|---|---|
| River at State Line | | 9.4 | 5.4 |
| Plus tributaries: | Yellowhawk | 17.1 | 14.4 |
| | East Little W. W. R. | 11.1 | 4.6 |
| | McEvoy Spring Branch | 4.8 | 3.3 |
| | | 42.4 | 27.7 |
| Minus diversion: | Gardena | 47.1 | 22.8 |
| | | − 4.7 | + 4.9 |
| River below Gardena diversion | | 3.2 | 10.3 |
| Gain | | 7.9 | 5.4 |

1932—State Line to Kennedy Bridge

| | June 22–23 Mean of two measurements | July 16[1] | July 29 | Aug. 21 | Sept. 11 |
|---|---|---|---|---|---|
| River at State Line | 19.0 | 7.6 | 5.8 | 5.5 | 4.2 |
| Plus tributaries: | | | | | |
| Yellowhawk | 32.2 | 25.0 | 11.3 | 8.1 | 4.9 |
| East L. W. W. R. | 21.2 | 8.8 | 7.6 | 5.0 | 6.7 |
| McEvoy Spring Br. | 3.2 | 3.5 | 3.0 | 1.5 | 0.9 |
| | 75.6 | 44.9 | 27.7 | 20.1 | 16.7 |
| Minus diversion: | | | | | |
| Gardena | 83.1 | 50.5 | 22.7 | 15.7 | .... |
| | − 7.5 | − 5.6 | + 5.0 | + 4.4 | +16.7 |
| River below Kennedy Br. | 0.7 | 4.0 | 10.1 | 9.7 | 26.2 |
| Gain | 8.2 | 9.6 | 5.1 | 5.3 | 9.5 |

[1] Rain on July 15th doubtless incraesed the gain measured on the 16th.

[fol. 353] Table VII (Continued)

Seepage Gain in Flow of the Walla Walla River in Washington

1932—Kennedy Bridge to Mouth of Pine Creek

| | June 25–26 Mean of two measurements | July 16[1] | July 29 | Aug. 21 | Sept. 11 |
|---|---|---|---|---|---|
| River below Kennedy Br. | 4.0 | 4.0 | 10.1 | 9.7 | 26.2 |
| Plus tributaries: | | | | | |
| Blue Mt. Spring Br. | 2.2 | 1.5 | 1.8 | 1.3 | 1.1 |
| West Little W. W. R. | 2.2 | 5.1 | 4.4 | 1.0 | 0.3 |
| Mill Creek | 2.4 | 2.8 | 2.4 | 0.7 | 0.3 |
| Dry Creek | 0.8 | 1.3 | 0.6 | 0.3 | 0.3 |
| Cross-over from Mud Cr. | 1.7 | 0.4 | 0.1 | 0.1 | 0.2 |
| Mud Creek | 0.8 | 1.2 | 0.5 | 0.2 | 3.3 |
| Total tributaries | 10.1 | 12.3 | 9.8 | 3.6 | 5.5 |
| Sum | 14.1 | 16.3 | 19.9 | 13.3 | 31.7 |
| Minus diversions: | | | | | |
| Smith-Harer | 2.0 | 1.3 | 1.0 | 1.6 | 2.1 |
| Dicus | 0.2 | 0.3 | 0.1 | 0.1 | .... |
| Bergevin-Williams | 3.8 | 3.5 | 4.3 | 4.5 | 4.7 |
| Mud Creek (Lowden) No. 2 | 3.9 | 4.6 | 3.6 | .... | 6.9 |
| Garden City (Sinkler) | 0.5 | 2.3 | 1.0 | 1.9 | 6.0 |
| Rader | 5.7 | 4.9 | 7.3 | 3.7 | .... |
| Touchet Irr. & Imp. Co. | 6.0 | 4.5 | 4.1 | 2.8 | 5.5 |
| Total diversions | 22.1 | 21.4 | 21.4 | 14.6 | 25.2 |
| Difference | − 8.0 | − 5.1 | − 1.5 | − 1.3 | + 6.5 |
| River above Pine Creek | 2.4 | 1.9 | 1.0 | 0.5 | 2.6 |
| Gain | 10.4 | 7.0 | 2.5 | 1.8 | 3.9 |
| Total gain in flow between State Line and mouth of Pine Creek | 18.6 | 16.6 | 7.6 | 7.1 | 13.4 |

[1] Rain on July 15 doubtless increased the gain measured on the 16th.

[fol. 354] OREGON EXHIBIT No. 32

At a regular meeting of the Board of Control of the State of Oregon, commenced and held at the office of the Board of Control, in the Capitol Building, in the City of Salem, Oregon, on Wednesday, the 12th day of April, 1911, at the hour of one o'clock P. M., those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent Water Division No. 1.
Geo. T. Cochran, Superintendent Water Division No. 2.

* * * * * * *

On motion of Geo. T. Cochran the following persons were appointed to act as Water Masters:

Willard Bradley, of Freewater, for Umatilla County.
James Sills, of Cove, for Union County. * * *

At a special meeting of the Board of Control of the State of Oregon, commenced and held at the office of the Board of Control, in the Capitol Building, in the City of Salem, Oregon, on Monday, the 19th day of June, 1911, at the hour of nine o'clock A. M., those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.
George T. Cochran, Superintendent of Water Division No. 2.

* * * * * * *

Mr. Willard Bradley of Freewater tendered to George T. Cochran, Superintendent of Water Division No. 2, his resignation as water master for Umatilla County. This resignation was accepted and Mr. L. D. Howland was appointed to take his place. This appointment to be effective July 5th, 1911. * * *

[fol. 355] At the regular, semi-annual meeting of the Board of Control, commenced on the 9th day of April, 1913, at the hour of 10:00 A. M., and held in the office of the Board

of Control, in the Capitol Building, in the City of Salem, Oregon, those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.

Whereupon, on motion, the meeting adjourned until the 24th day of April, 1913.

At an adjourned meeting of the Board of Control, held in the office of said Board, in the Capitol Building, in the City of Salem, Oregon, on the 24th day of April, 1913, at the hour of 10:00 o'clock A. M. of said day those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.
Geo. T. Cochran, Superintendent of Water Division No. 2.

Whereupon the following proceedings were had, to-wit:

• • • • • • •

On motion of Mr. Geo. T. Cochran, the following persons were appointed to act as Water Masters:

William Gardner, for Baker and Union Counties.
L. A. Reineman, for Umatilla and Morrow Counties.
Warren W. Roeder, for Malheur County, to succeed Mr. Ivan E. Oakes, whose resignation was submitted and accepted at this time. • • •

[fol. 356] Salem, Oregon, April 10, 1918.

A regular meeting of the State Water Board was held this day in the office of the President of the Board at 10:30 A. M.

Present:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent Water Division No. 1.
Geo. T. Cochran, Superintendent Water Division No. 2.

Whereupon the following proceedings were had, to-wit:

* * * * * * *

Upon the recommendation of the Superintendent of Water Division No. 2, Mr. Geo. Gombert of Vale, Oregon, was appointed as water master for Malheur County, and Mr. Aubrey E. Perry of Pendleton, Oregon, was appointed as water master for Umatilla and Morrow Counties.

[fol. 357] State of Oregon

Water District No. 5

Certificate of Appointment of Water Master

This is to certify, that J. F. Spencer of Umatilla County, Oregon, of Water District No. 5, within the Counties of Umatilla, Morrow, and Gilliam, Oregon, is hereby appointed water master of said Water District, to hold said office and fulfill and perform all the duties thereof, according to law, until his successor shall have been appointed and shall have qualified.

Witness my hand this 2nd day of January, 1929.

Rhea Luper, State Engineer.

[fol. 358] State of Oregon,
County of Marion, ss:

I, Chas. E. Stricklin, State Engineer of the State of Oregon hereby certify that the foregoing copies of the excerpts of the minutes of the Board of Control and State Water Board covering the meetings of said boards pertaining to the appointments of water masters for Umatilla County, Oregon and the foregoing certificate of appointment have been compared with the original minutes and certificate of appointment as the same appear of record and on file in this office and in my custody, and are true and correct copies thereof.

Dated this 21st day of March, 1934.

Chas. E. Stricklin, State Engineer.

[fol. 359] OREGON EXHIBIT No. 39

Gardena Tracts

Irrigated Lands Above the Elevation of The Old Walla Walla Canal

| | | |
|---|---|---|
| T. 6 N. R. 33 E. W. M. | | |
| Section 4 | | |
| SE¼ of SE¼ | 40 | |
| SW¼ of NE¼ | 19.2 | |
| NE¼ of SW¼ | 18.4 | |
| SE¼ of SW¼ | 38.4 | |
| SW¼ of SW¼ | 2.2 | |
| SW¼ of SE¼ | 40. | |
| NW¼ of SE¼ | 40. | |
| NE¼ of SE¼ | 30.8 | |
| SE¼ of NE¼ | 0.4 | 229.4 |
| Section 9 | | |
| NE¼ of NE¼ | 40. | |
| NW¼ of NE¼ | 37.3 | |
| SW¼ of NE¼ | 7.9 | |
| SE¼ of NE¼ | 26.4 | |
| NE¼ of NW¼ | 28.7 | |
| NW¼ of NW¼ | 5.8 | 146.1 |
| Section 10 | | |
| NE¼ of NE¼ | 23.2 | |
| NW¼ of NE¼ | 40. | |
| SW¼ of NE¼ | 40. | |
| SE¼ of NE¼ | 40. | |
| NE¼ of NW¼ | 40. | |
| NW¼ of NW¼ | 40. | |
| SW¼ of NW¼ | 33.3 | |
| SE¼ of NW¼ | 40. | |
| NW¼ of SW¼ | 5 | |
| NE¼ of SW¼ | 25.2 | |
| NW¼ of SE¼ | 34. | |
| NE¼ of SE¼ | 38.6 | |
| SE¼ of SE¼ | 13.8 | |
| SW¼ of SE¼ | 2.2 | 415.3 |
| T. 6 N. R. 34 E. W. M. | | |
| Section 7 | | |
| NW¼ of SW¼ | 8.8 | |
| SW¼ of SW¼ | 20.8 | 29.6 |
| Section 12 | | |
| SW¼ of NW¼ | 10.4 | |
| NW¼ of SW¼ | 4.8 | 15.9 |
| T. 6 N. R. 33 E. W. M. | | |
| NW¼ of NW¼ | 16.4 | |
| NE¼ of NW¼ | 15.2 | |
| SW¼ of NW¼ | 40 | |
| SE¼ of NW¼ | 29.6 | |
| NE¼ of SW¼ | 40. | |
| NW¼ of SW¼ | 37.8 | |
| SW¼ of SW¼ | 6.1 | |
| SE¼ of SW¼ | 30.3 | |
| NW¼ of SE¼ | 40. | |
| NE¼ of SE¼ | 18.8 | |
| SW¼ of SE¼ | 27. | |
| SE¼ of SE¼ | 32. | |
| SW¼ of NE¼ | 10.4 | |
| SE¼ of NE¼ | 7.6 | 351.2 |
| Section 12 | | |
| NE¼ of SE¼ | 21. | |
| NW¼ of SE¼ | 23.6 | |
| SW¼ of SE¼ | 40. | |
| SE¼ of SE¼ | 40. | 127.6 |
| Section 13 | | |
| NE¼ of NE¼ | 18. | |
| NW¼ of NE¼ | 59. | |
| NE¼ of NW¼ | 62.3 | |
| NW¼ of NW¼ | 62.8 | |
| Lot 1 | 35 | |
| Lot 2 | 31 | |
| Lot 3 | 38 | |
| Lot 4 | 11.3 | 317.4 |
| Section 14 | | |
| NE¼ of NE¼ | 34. | |
| NW¼ of NE¼ | 10. | 44. |
| Total | 1675.6 Acres | |

[fol. 360] OREGON EXHIBIT No. 42

[Title omitted]

Hydrographic Data and Measurements Submitted With the Testimony of Ed K. Humphrey

[fol. 361]

## Summary of 1933 Use Data

### Test Places

| User | Soil Class | Acres Irrigated | Ac. ft. used per 30 day Mo. | Mean daily use Assuming Continuous Flow | |
|---|---|---|---|---|---|
| | | | | Sec. Ft. | Min. In |
| Babcock, D. | 1 & 3 | 10.0 | 2.87 | .0482 | 1.93 |
| Bookout, W. R. | 1 & 2 | 15.0 | 1.83 | .0304 | 1.22 |
| Eiffert, C. | 1 & 3 | 16.7 | 3.31 | .0556 | 2.25 |
| Harris, C. | 1 & 2A | 13 | 2.27 | .0380 | 1.52 |
| Hermann, W. | 2A & 3 | 19.0 | 1.93 | .0325 | 1.30 |
| Herr, C. | 3 | 8.0 | 2.57 | .0432 | 1.73 |
| Karker, C. | 3 | 5.9 | 2.62 | .0440 | 1.76 |
| Knopf, Geo. | 1 & 3 | 3 | 2.87 | .0482 | 1.93 |
| Roeder, W. W. | 3 | 19.3 | 2.69 | .0452 | 1.81 |

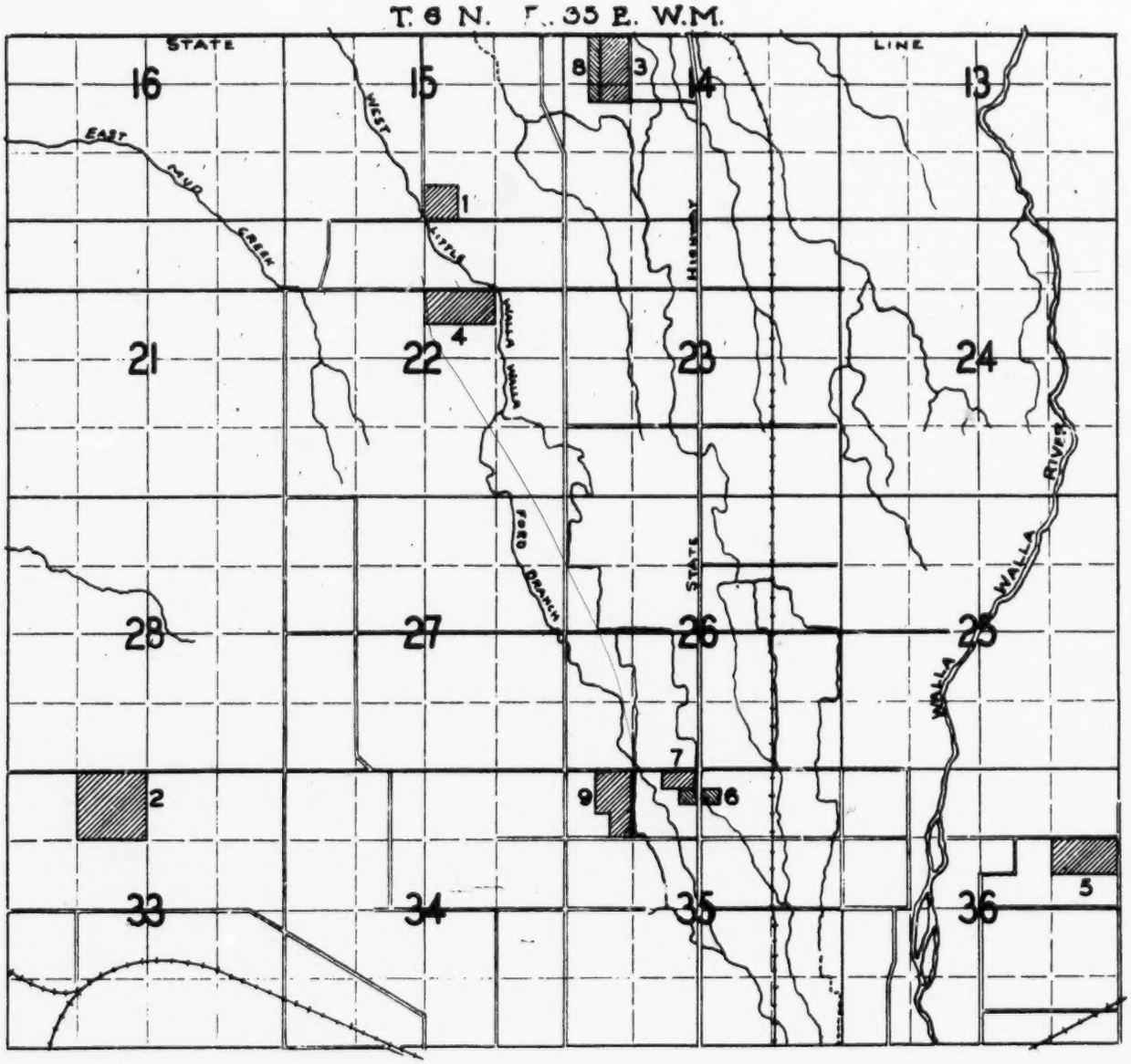
### Location of Test Places

| | | | |
|---|---|---|---|
| Babcock | SW¼ | SE¼ | Sec. 15 T 6N. R. 35E |
| Bookout | NE¼ | NW¼ | Sec. 33 T 6N. R. 35E |
| Eiffert | SW¼ | NW¼ | Sec. 14 T 6N. R. 35E |
| Harris | SW¼ | NE¼ | Sec. 22 T 6N. R. 35E |
| Hermann | SE¼ | NE¼ | Sec. 36 T 6N. R. 35E |
| Herr | NW¼ | NE¼ | Sec. 35 T 6N. R. 35E |
| | NE¼ | NW¼ | Sec. 35 T 6N. R. 35E |
| Karker | NE¼ | NW¼ | Sec. 35 T 6N. R. 35E |
| Knopf | SW¼ | NW¼ | Sec. 14 T 6N. R. 35E |
| Roeder | NW¼ | NW¼ | Sec. 35 T 6N. R. 35E |

(Here follows 1 photo folio 362.)

# MAP SHOWING LOCATION OF
# TEST PLACES

1 – D. H. BABCOCK
2 – W. R. BOOKOUT
3 – CHAS. EIFFERT
4 – C. B. HARRIS
5 – WALTER HERMANN
6 – C. E. HERR
7 – C. J. KARKER
8 – GEO. KNOPF
9 – W. W. ROEDER



[fol. 363]

Eifferrt Place (16.7 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | Per Mo. | Per Day | Per Mo. of 30 days |
| Jun. 3–30..... | 28 | 1.188 | .0711 | 1.188 | .0711 | 66.0 | 3.95 | .... | .... |
| July..... | 31 | 1.038 | .0622 | 1.038 | .0622 | 63.8 | 3.82 | .... | .... |
| Aug..... | 31 | .744 | .0445 | .744 | .0445 | 45.7 | 2.74 | .... | .... |
| Sep. 1–20..... | 20 | .686 | .0411 | .686 | .0411 | 27.2 | 1.63 | .... | .... |
| Total..... | 110 | ..... | ..... | ..... | ..... | 202.7 | 12.14 | .110 | 3.31 |

Herr Place (8.0 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | Per Mo. | Per Day | Per Mo. of 30 days |
| Jun. 12–30..... | 19 | .428 | .0535 | .428 | .0535 | 16.1 | 2.01 | .... | (Derived |
| July..... | 31 | .302 | .0377 | .302 | .0377 | 18.6 | 2.32 | .... | from Col.8 |
| August..... | 31 | .289 | .0361 | .289 | .0361 | 17.8 | 2.22 | .... | .... |
| Sep. 1–23..... | 23 | .411 | .0514 | .411 | .0514 | 18.8 | 2.35 | .... | .... |
| Totals..... | 104 | ..... | ..... | ..... | ..... | 71.3 | 8.90 | .0856 | 2.57 |

[fol. 364]

Bookout Place (15.0 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used Per Mo. | Per Day | Per Mo. of 30 days |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | | | |
| Jun. 1–30..... | 30 | .475 | .0317 | .475 | .0317 | 28.3 | 1.89 | .... | .... |
| Jul 1–4..... | 4 | .31 | .0207 | .31 | .0207 | 2.46 | .16 | .... | .... |
| Totals..... | 34 | ..... | ..... | ..... | ..... | 30.76 | 2.05 | .061 | 1.83 |

[fol. 365]

Hermann Place (19.0 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used Per Mo. | Per Day | Per Mo. of 30 days |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | | | |
| Jun. 3–30..... | 21 | .702 | .037 | .527 | .0273 | 29.3 | 1.54 | .... | .... |
| July..... | 31 | .585 | .0308 | .585 | .0308 | 36.0 | 1.89 | .... | .... |
| August..... | 31 | .583 | .0307 | .583 | .0307 | 35.8 | 1.88 | .... | .... |
| September..... | 21 | .626 | .0330 | .626 | .0330 | 26.1 | 1.37 | .... | .... |
| Totals..... | 104 | ..... | ..... | ..... | ..... | 127.2 | 6.68 | .0642 | 1.93 |

Harris Place (13 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used Per Mo. | Per Day | Per Mo. of 30 days |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | | | |
| Jun. 7–30 | 22 | .569 | .0438 | .522 | .0321 | 24.8 | 1.91 | .... | .... |
| July | 29 | .544 | .0418 | .509 | .0392 | 31.3 | 2.41 | .... | .... |
| August | 21 | .385 | .0296 | .261 | .0200 | 16.0 | 1.23 | .... | .... |
| September | 16 | .450 | .0346 | .240 | .0185 | 14.3 | 1.10 | .... | .... |
| Totals | 88 | ..... | ..... | ..... | ..... | 86.4 | 6.65 | .0756 | 2.27 |

[fol. 366]

Roeder Place (19.3 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used Per Mo. | Per Day | Per Mo. of 30 days |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | | | |
| Jun. 5–30 | 25 | 1.30 | .0673 | 1.25 | .0648 | 64.4 | 3.34 | .... | .... |
| July | 31 | .662 | .0343 | .661 | .0343 | 40.8 | 2.11 | .... | .... |
| August | 31 | .732 | .0379 | .732 | .0379 | 45.0 | 2.33 | .... | .... |
| Sep. 1–11 | 11 | .890 | .0461 | .890 | .0461 | 19.4 | 1.01 | .... | .... |
| Totals | 98 | ..... | ..... | ..... | ..... | 169.6 | 8.79 | .0897 | 2.69 |

[fol. 367]

Karker Place (5.9 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | Per Mo. | Per Day | Per Mo. of 30 days |
| Jun. 3–30 | 28 | .367 | .0622 | .367 | .0622 | 20.4 | 3.46 | .... | .... |
| July | 31 | .197 | .0334 | .197 | .0334 | 12.1 | 2.05 | .... | .... |
| August | 31 | .224 | .0380 | .224 | .0380 | 13.8 | 2.34 | .... | .... |
| Sep. 1–9 | 9 | .267 | .0453 | .267 | .0453 | 4.76 | .81 | .... | .... |
| Totals | 99 | ..... | ..... | ..... | ..... | 51.1 | 8.66 | .0875 | 2.62 |

Knopf Place (3 acres irrigated)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F. For number of days used | | Mean Daily Discharge in S. F. Assuming continuous flow | | Total ac. ft. used | Total Acre-feet per Ac. used | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per A | | Per A | | Per Mo. | Per Day | Per Mo. of 30 days |
| June 26–30 | 5 | .139 | .0463 | .139 | .0463 | 1.38 | .46 | .... | .... |
| July | 31 | .154 | .0513 | .154 | .0513 | 9.47 | 3.16 | .... | .... |
| August | 31 | .136 | .0453 | .136 | .0453 | 8.36 | 2.79 | .... | .... |
| Sept. 1–24 | 24 | .144 | .0480 | .144 | .0480 | 6.86 | 2.29 | ..... | ..... |
| Totals | 91 | ..... | ..... | ..... | ..... | 26.07 | 8.70 | .0956 | 2.87 |

[fol. 368] Table Showing Per Acre Delivery Amounts Based on the Preceding Figures and the Flow in the Gardena Canal.

1933

| Month | Diverted from River into Gardena Canal: Mean daily discharge in second-feet | Diverted from River into Gardena Canal: Total acre-feet | Ac. Ft. per acre diverted | Ac. Ft. per acre diverted to project | Continuous flow per acre available if applied uniformly to 5,251 acres: Diverted from River: Sec. Ft. | Diverted from River: Min. In. | Delivered to Project: Sec. Ft. | Delivered to Project: Min In. |
|---|---|---|---|---|---|---|---|---|
| Mar. (6–31) | 72.6 | 3,740 | .71 | .62 | .0138 | .552 | .0121 | .484 |
| April | 100 | 5,950 | 1.13 | .99 | .0190 | .760 | .0166 | .664 |
| May | 104 | 6,400 | 1.22 | 1.07 | .0198 | .792 | .0173 | .692 |
| June | 98.1 | 5,840 | 1.11 | .97 | .0187 | .748 | .0163 | .652 |
| July | 47.1 | 2,900 | .55 | .48 | .0090 | .360 | .0079 | .316 |
| August | 22.8 | 1,400 | .27 | .24 | .0043 | .172 | .0038 | .152 |

Note:—Transportation loss between river and project assumed to be 12.7%.

(49b)

Babcock Place (10.0 acres)

Water Used During Period of Test

| Month | Number of days used | Mean Daily Discharge in S. F.: For number of days used | Mean Daily Discharge in S. F.: For number of days used: Per A | Mean Daily Discharge in S. F.: Assuming continuous flow | Mean Daily Discharge in S. F.: Assuming continuous flow: Per A | Total ac. ft. used | Total Acre-feet per Ac. used: Per Mo. | Total Acre-feet per Ac. used: Per Day | Total Acre-feet per Ac. used: Per Mo. of 30 days |
|---|---|---|---|---|---|---|---|---|---|
| Jun. 3–30 | 28 | .633 | .0633 | .633 | .0633 | 35.2 | 3.52 | .... | .... |
| July | 27 | .443 | .0443 | .385 | .0385 | 23.7 | 2.37 | .... | .... |
| Aug. | 17 | .352 | .0352 | .193 | .0193 | 11.9 | 1.19 | .... | .... |
| Sep. 1–9 | 5 | .296 | .0296 | .164 | .0164 | 2.93 | .29 | .... | .... |
| Totals | 77 | ..... | ..... | ..... | ..... | 73.73 | 7.37 | .0957 | 2.87 |

(75b)

[fol. 369]

1932

Use of Water from Wells

| Owner | Acres irrigated | May KWH | May Ac. Ft. Ac. | June KWH | June Ac. Ft. Ac. | July KWH | July Ac. Ft. Ac. | August KWH | August Ac. Ft. Ac. | Sept. KWH | Sept. Ac. Ft. Ac. | Total Power Bill | Total Ac. Ft. Ac. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Breithaupt, C. | 9.5 | 374 | .37 | 1,996 | 1.95 | 2,541 | 2.48 | 1,801 | 1.76 | 761 | .74 | 101.07 | 7.30 |
| Buroker, M. A. | 12 | ..... | .... | ..... | .... | ..... | .... | ..... | .... | ..... | .... | ..... | .... |
| Carteer, M. | 2.6 | 2 | .... | 174 | .60 | 410 | 1.42 | 324 | 1.12 | ..... | .... | 59.00 | 3.14 |
| Delahe, Mrs. | 9.8 | ..... | .... | 90 | .11 | 1,947 | 2.38 | 1,657 | 2.03 | 689 | .84 | 64.60 | 5.36 |
| Dougherty, W. A. | 10. | ..... | .... | 7.26 | .77 | 1,601 | 1,71 | 962 | 1.03 | 238 | .25 | 104.76 | 3.76 |
| Gent, W. A. | 19.7 | 210 | .25 | 8 | .... | 996 | 1.19 | 1,083 | 1.29 | 75 | .09 | 52.49 | 2.82 |
| Henry, O. Est. | 10. | ..... | .... | ..... | .... | 1,718 | 1.99 | 1,805 | 2.09 | 1,076 | 1.24 | 61.50 | 5.32 |
| Lefor, Ed. | 9.8 | 1,637 | 1.93 | 1,422 | 1.66 | 2,398 | 2.80 | 2,172 | 2.53 | 599 | .70 | 136.77 | 9.60 |
| Miller, Andy | 8.0 | 10 | .... | 5 | .... | 985 | 1.26 | 1,123 | 1.44 | 271 | .35 | 53.63 | 3.05 |
| Morris, W. H. | 4.4 | ..... | .... | ..... | .... | 798 | 1.44 | 748 | 1.34 | 269 | .48 | 40.39 | 3.26 |
| Pescillo, Joe | 19.8 | ..... | .... | 79 | .034 | 2,648 | 1.14 | 2,322 | 1.00 | 2,283 | .98 | 106.90 | 3.15 |
| Reese, Alpha | 9.5 | ..... | .... | 429 | .43 | 2,835 | 2.82 | 2,127 | 2.12 | 1,185 | 1.18 | 108.80 | 6.55 |
| Redfern, A. | 19.8 | ..... | .... | ..... | .... | 2,592 | 1.58 | 2,192 | 1.34 | 1,663 | 1.02 | 93.35 | 3.94 |
| Samuel, Roy | 9.8 | 54 | .053 | 274 | .27 | 1,233 | 1.21 | 1,556 | 1.53 | 815 | .80 | 94.93 | 3.86 |

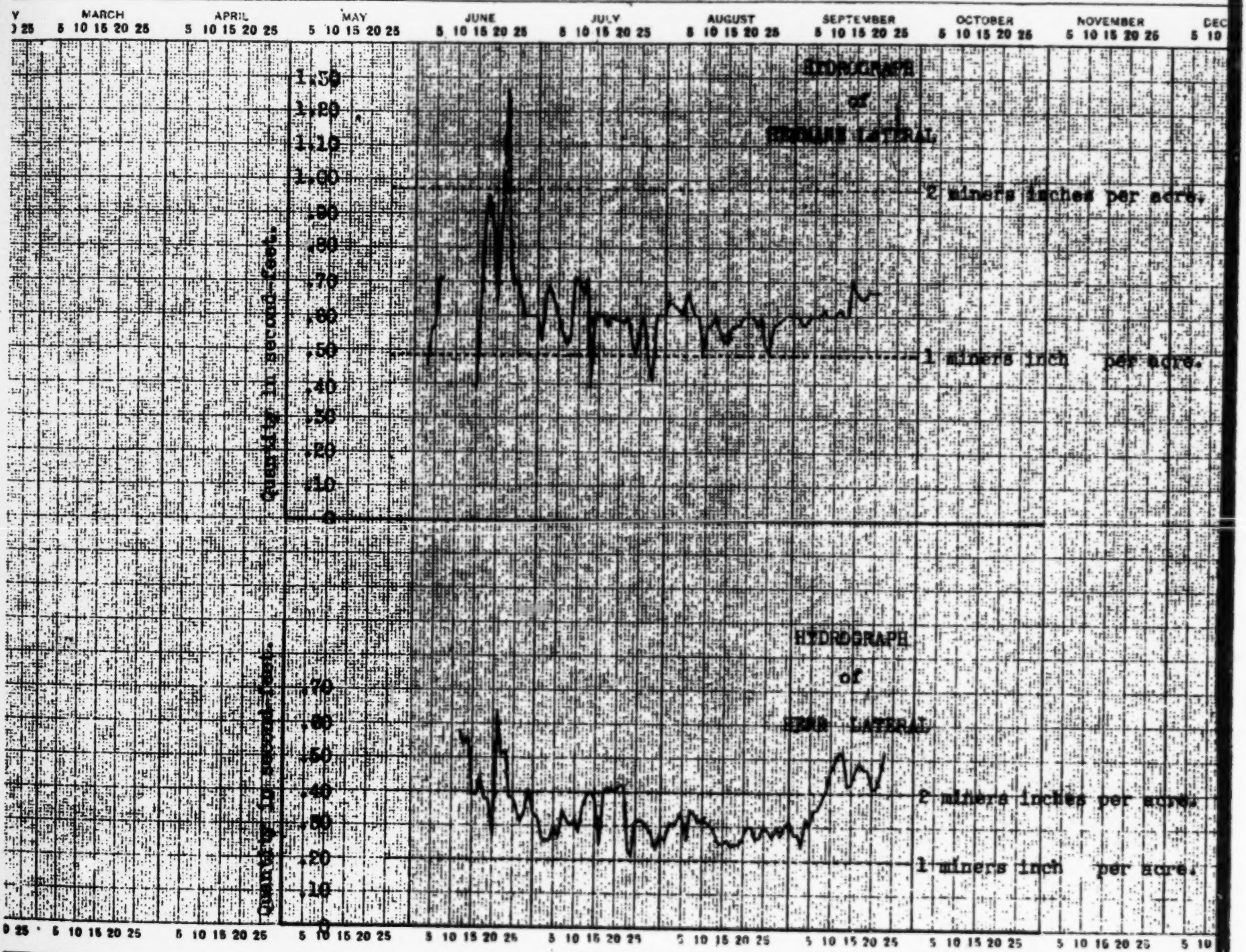
[fol. 370]

## Pumping Equipment Efficiency Data

| Owner | Forty | Location Sec. | Tp. | Rg. | Date of test 1933 | Acres irrigated | Static head | Friction head | Discharge in Sec. ft. | Energy input in KW. | Efficiency percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Breithaupt, Chas. | SE¼NE¼ | 34 | 6N. | 35E | Aug. 8 | 9.5 | 28.95 | 3.93 | .359 | 3.19 | 31.3 |
| Buroker, M. A. | SW¼SE¼ | 27 | 6N. | 35E | Aug. 7 | 12.0 | 50.43 | .55 | .421 | 4.95 | 36.8 |
| Carter, M. | SE¼SE¼ | 34 | 6N. | 35E | Jul. 22 | 2.6 | 17.30 | .42 | .150 | 1.66 | 16.3 |
| Delahe, Mrs. | SE¼NW¼ | 34 | 6N. | 35E | Aug. 8 | 9.8 | 38.2 | 1.00 | .371 | 2.56 | 48.1 |
| Dougherty, W. A. | NW¼SE¼ | 34 | 6N. | 35E | Aug. 8 | 10. | 44.98 | 8.20 | .553 | 4.29 | 58.1 |
| #1 Farmer's Bro. Co. | NW¼SW¼ | 33 | 6N. | 35E | Jul. 22 | .... | 31.37 | 4.82 | .446 | 2.87 | 44.6 |
| #2 " " " | NW¼SW¼ | 33 | 6N. | 35E | Jul. 22 | .... | 35.00 | 7.96 | 1.080 | 10.13 | 38.7 |
| Gent, W. A. | SE¼SW¼ | 35 | 6N. | 35E | Aug. 7 | 19.7 | 21.35 | .14 | .727 | 2.70 | 51.9 |
| Henry, O., Est. | SE¼SW¼ | 34 | 6N. | 35E | Aug. 11 | 10. | 42.85 | 1.58 | .446 | 3.19 | 52.6 |
| Irons, John | NE¼NW¼ | 3 | 5N. | 35E | Jul. 22 | 7.8 | 23.70 | 4.14 | .421 | 2.97 | 33.4 |
| Kirkwood, R. W. | NW¼SE¼ | 34 | 6N. | 35E | Aug. 8 | 10. | 42.40 | 2.64 | .279 | 1.77 | 60.3 |
| Lefor, Ed. | SE¼NW¼ | 34 | 6N. | 35E | Aug. 8 | 9.8 | 43.53 | 2.85 | .581 | 4.21 | 54.4 |
| Miller, Andy | NW¼SW¼ | 34 | 6N. | 35E | Aug. 11 | 8.0 | 42.36 | 3.30 | .312 | 2.52 | 47.9 |
| Morris, W. H. | SE¼NW¼ | 34 | 6N. | 35E | Aug. 8 | 4.4 | 46.53 | 2.61 | .267 | 2.83 | 39.8 |
| Pescillo, Joe | SE¼NW¼ | 33 | 6N. | 35E | Aug. 9 | 19.8 | 48.55 | 5.80 | .347 | 3.36 | 47.6 |
| Reese, Alpha | NE¼SW¼ | 34 | 6N. | 35E | Aug. 7 | 9.5 | 55.52 | 6.66 | .404 | 3.53 | 60.3 |
| Redfern, Arthur | SE¼NW¼ | 33 | 6N. | 35E | Aug. 9 | 19.8 | 42.65 | 7.81 | .499 | 3.41 | 62.6 |
| Samuel, Roy | SW¼NE¼ | 34 | 6N. | 35E | Aug. 8 | 9.8 | 43.45 | 4.00 | .347 | 2.99 | 46.6 |
| Kirkwood, R. K. | NW¼SE¼ | 34 | 6N. | 35E | Aug. 8 | 9.6 | 33.03 | 3.21 | .324 | 2.17 | 51.2 |
| | Mean | | | | | | 38.85 | 3.77 | .44 | 3.44 | 46.4 |

(Here follow 3 photos, folios 371–373)

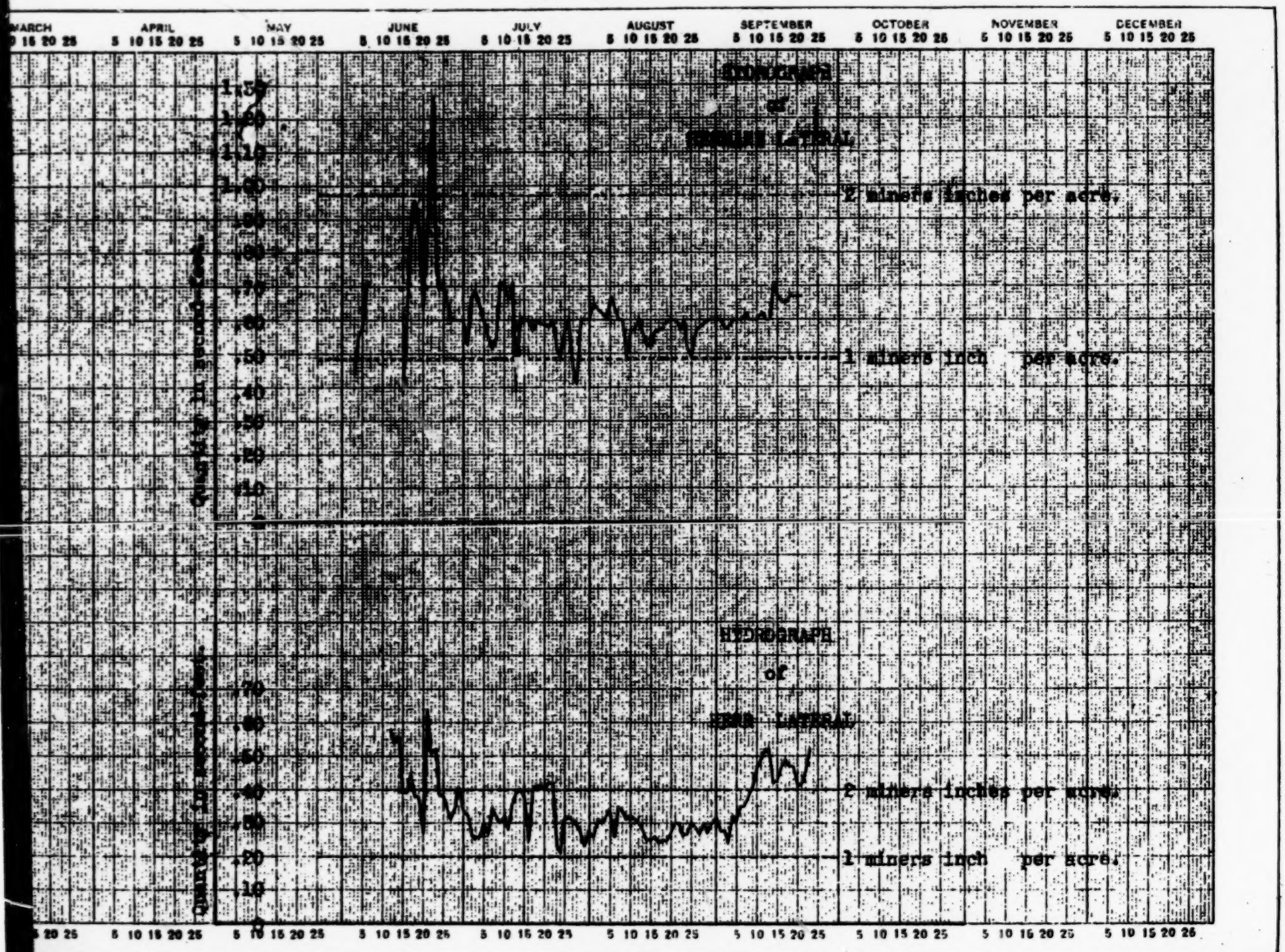
1933





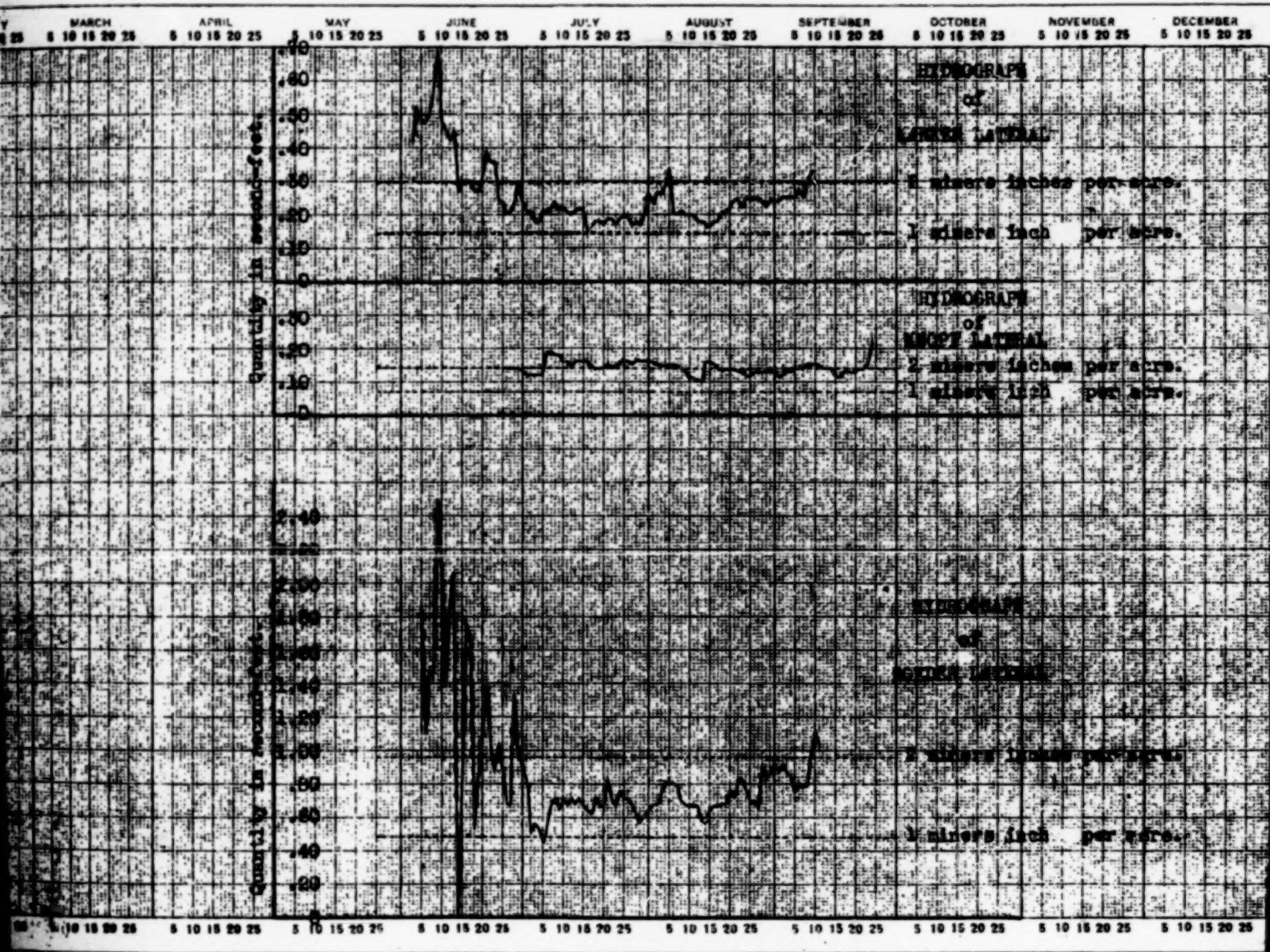

KEUFFEL & ESSER CO., NE

1933




REUFFEL & ESSER CO., NEW YORK, NO. 348

1933




REUFFEL & ESSER CO., NEW YORK.

OREGON EXHIBIT NO. 43



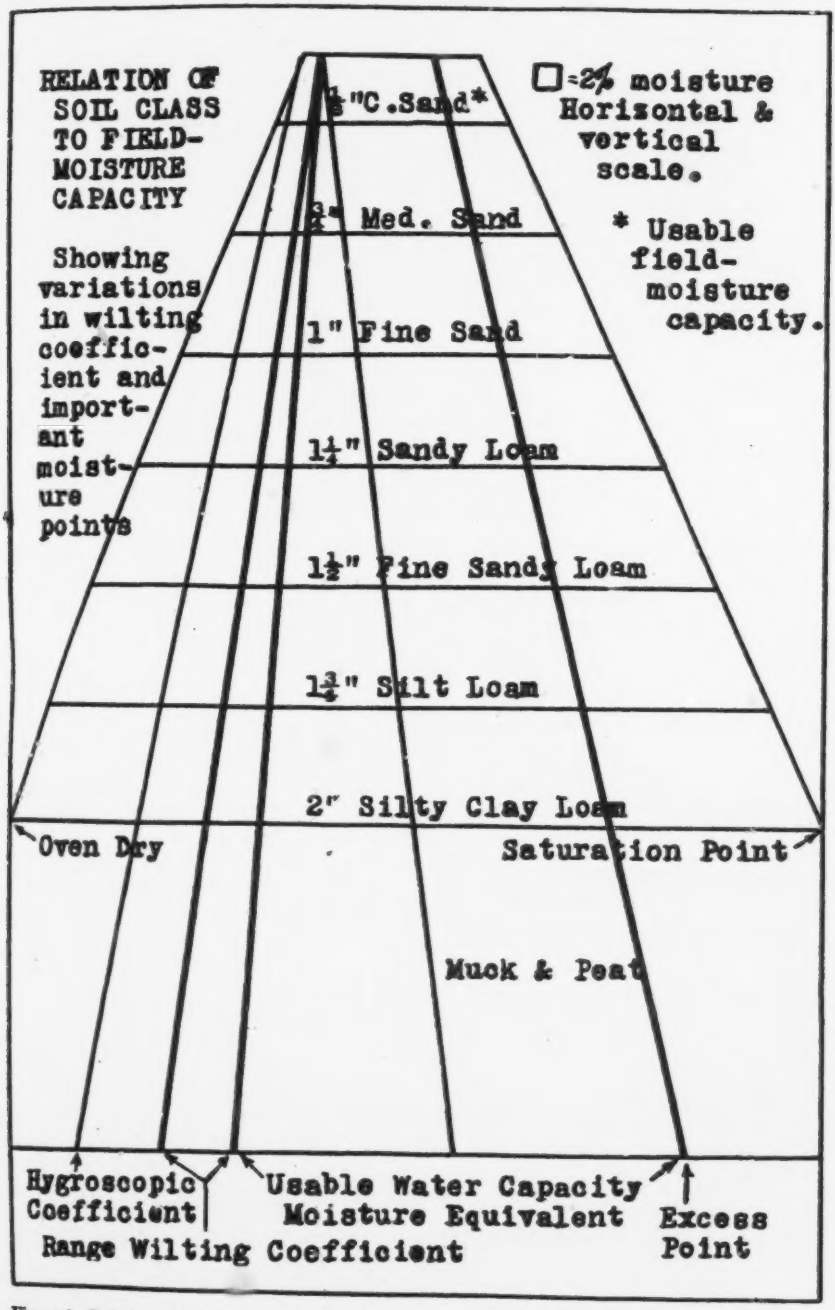



Figure 1. Relation of soil class to field moisture capacity. Relations are not strictly linear for coarse soils. (*From Soil Sci. 14:163.*)

[fol. 374]

OREGON EXHIBIT No. 44

Analysis of Alleged Over-diversions 1933, all Quantities Expressed in Second Feet

| Channel | Acres | Decreed at users weir | 20% trans. loss | Total nec. at measuring point to deliver Dec. Amt. | July | | | August | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mean diversion | Under diversion | Over diversion | Mean diversion | Under diversion | Over diversion |
| West Crockett | 342.05 | 12.83 | 3.21 | 16.04 | 14.13 | 1.91 | .... | 13.86 | 2.18 | .... |
| East Crockett | 220.98 | 8.28 | 2.07 | 10.35 | 10.71 | .... | .36 | 10.77 | .... | .42 |
| Stillman | 78.15 | 2.93 | .... | 2.93 | 5.06 | .... | 2.13 | 4.83 | .... | 1.90 |
| Ford | 520.00 | 19.5 | 4.88 | 24.38 | 20.42 | 3.96 | .... | 18.45 | 5.93 | .... |
| East Side and McCoy Stock | 258.22 | 10.68 | 2.67 | 13.35 | 13.19 | .16 | .... | 12.50 | .85 | .... |
| Milton Ditch Con. Spec. Duty | 330.87 | 13.62 | .... | 13.62 | 15.38 | .... | 1.76 | 15.35 | .... | 1.73 |
| Powell | 219.15 | 8.22 | .... | 8.22 | 9.8 | .... | 1.58 | 8.4 | .... | .18 |
| Perkins Con. Spec. Duty | 43.27 | 3.20 | .... | 3.20 | 3.0 | .20 | .... | 2.88 | .32 | .... |
| Tum-A-Lum | 37.17 | 1.39 | .... | 1.39 | 2.6 | .... | 1.21 | 1.94 | .... | .55 |
| Totals | 2,049.86 | 80.65 | 12.38 | 93.48 | 94.29 | 6.23 | 7.04 | 88.98 | 9.28 | 4.78 |
| Net over diversion in all above channels | ..... | ..... | .... | ..... | ..... | .... | .81 | ..... | .... | .... |
| Net under diversion in all above channels | ..... | ..... | .... | ..... | ..... | .... | .... | .... | 4.50 | .... |

(Milton Ditch)—Note: Any over-diversion, which in both July and August was under two-second feet was used to irrigate the lands upon the Finis Ditch, which lands have a priority in that waste water prior to 1909 for 107.5 acres. This right was awarded them by the old decree in 1912.

[fol. 375] OREGON EXHIBIT No. 45

[Title omitted]

Bridges in Oregon and Washington

Their Names and Respective Locations

[fol. 376] List of Bridges Across Walla Walla River

Oregon:

Dorothy, or Demaris, Bridge across S. Fork in N. W. ¼ S. W. ¼ Sect. 22, T. 5 N., R. 36 E. Bridge across N. Fork at Gaging Station 216 in N. W. ¼ N. E. ¼ Sect. 22, T. 5 N., R. 36 E. West's Bridge at intake of Spence Ditch in N. E. ¼ N. E. ¼ Sect. 20, T. 5 N., R. 36 E. Bridge at New Milton Power Plant in N. W. ¼ S. W. ¼ Sect. 18, T. 5N., R. 36 E. Bridge at head of Miller Mill Race in N. E. ¼ S. E. ¼ Sect. 12, T. 5 N., R 35 E. Red, or Cemetery, Bridge at head of Little Walla Walla River in S. W. ¼ N. E. ¼ Sect. 12, T. 5 N., R. 35 E. Milton Nursery Bridge at head of Hudson Bay Canal in N. E. ¼ N. W. ¼ Sect. 1, T. 5 N., R. 35 E. McCoy Bridge on line between Sections 24 and 25, T. 6 N., R. 35 E.

Washington:

Pepper Bridge on line between Lots 1 and 2, Sect. 13, T. 6 N., R. 35 E. State Highway Bridge on North and South Center line of Sect. 11, T. 6 N., R. 35 E. L. O. Kennedy Memorial Bridge just below Gardena Canal intake in S. W. ¼ S. W. ¼ Sect. 3, T. 6 N., R. 35 E. Blue Mountain Bridge on North and South Line between Sects. 4 and 5 T. 6 N., R. 35 E. Mission Bridge on line between Sects. 31 and 32, T. 7 N., R. 35 E. Whitman Bridge on line between Narcisse Raymond Donation Land Claim and Lot 2, Sec. 31, T. 7 N., R. 35 E. McDonald Bridge on line between Sections 33 and 34, T. 7 N., R. 34 E. Lowden Bridge in S. W. ¼ S. W. ¼ Sect. 29, T. 7 N., R. 34 E. Hasseltine Bridge in S. E. ¼ N. W. ¼ Sect. 3, T. 6N., R. 33 E.

[fol. 377]

WASHINGTON EXHIBIT No. 46

Mechanical Analysis of Yakima Gravelly Loam
(fine earth.)

| No. | Locality | Description | Organic Matter P. ct. | Gravel, 2 to 1 mm. P. ct. | Coarse sand, 1 to 0.05 mm. P. ct. | Medium sand, 0.5 to 0.25 mm. P. ct. | Fine sand, 0.25 to 0.1 mm. P. ct. | Very fine sand, 0.1 to 0.05 mm. P. ct. | Silt, 0.05 to 0.005 mm. P. ct. | Clay, 0.005 to0.001mm. P. ct. |
|---|---|---|---|---|---|---|---|---|---|---|
| 6685 | NW. corner No. 11-40, sec. 19, T. 7N., R. 36E. | Gravelly loam, 0 to 12 inches | 1.50 | 3.12 | 6.26 | 3.92 | 11.50 | 21.70 | 44.34 | 7.88 |

From page 721 "Soil Survey of the Walla Walla Area, Washington, by J. Garnett Holmes, U. S. Bureau of Soils

[fol. 378]

EXHIBIT No. 47

Washington

Flow at Various Points of Walla Walla River in C. F. S.

June 14–30, 1933

| Date | Stations 214 & 216 | Nursery Bridge | McCoy Bridge | State Line | State Highway |
|---|---|---|---|---|---|
| June 14 | 524 | 300 | .. | 315 | .. |
| 15 | 514 | 300 | .. | 320 | .. |
| 16 | 478 | 216 | .. | 262 | .. |
| 17 | 435 | 206 | .. | 205 | .. |
| 18 | 387 | .. | .. | 205 | .. |
| 19 | 330 | .. | .. | 205 | .. |
| 20 | 300 | 25 | .. | 46 | .. |
| 21 | 282 | 32 | .. | 34 | 38 |
| 21 | ... | 52 | .. | 40 | .. |
| 22 | 259 | 28 | 22 | 36 | 40 |
| 22 | ... | 7 | .. | 30 | 37 |
| 23 | 241 | 3 | 18 | 28 | 34 |
| 23 | ... | ... | .. | 26 | .. |
| 24 | | 3 | 14 | 25 | 30 |
| 24 | | 38 | 12 | 23 | 28 |
| 25 | | 2 | 18 | 29 | 30 |
| 25 | | 1 | 12 | 30 | 33 |
| 25 | | | .. | 23 | 28 |
| 26 | 225 | 1 | 11 | 21 | 26 |
| 27 | | 1 | 9 | 20 | 27 |
| 28 | | 1 | 10 | 21 | 28 |
| 28 | | | 10 | 20 | 27 |
| 29 | | 1 | 9 | 20 | 26 |
| 30 | | 0 | 8 | 20 | 24 |

At Nursery Bridge practically dry remainder of summer.

At McCoy Bridge: From 7 cfs. on July 1, to 1. cfs. on July 15, to 0.4 cfs. July 31. Dry after Aug. 10.

Hardesty Creek: Mean flow June 14–30: 3.4 Cfs.

Birch Creek: Flow steady at approximately 0.2 cfs.

[fol. 379] Flow at Various Points of Walla Walla River

Fall 1933

| Date | Nursery Bridge | Opposite Dugger Place | Below McCoy Bridge | State Line | State Highway |
|---|---|---|---|---|---|
| Oct. 28... | 0.2 | ... | ... | ... | .. |
| Oct. 29... | 8 | ... | ... | 8 | 13 |
| Oct. 30... | 6 | ... | ... | 8 | 13 |
| Oct. 31... | 19 | ... | ... | 9 | 20 |
| Nov. 1... | 21 | ... | ... | 8 | 16 |
| Nov. 2... | 25 | ... | ... | 9 | 16 |
| Nov. 3... | 240 | ... | ... | 160 | .. |
| Nov. 18... | 16 | ... | ... | 17 | 20 |
| Nov. 20... | 18 | ... | ... | 17 | 20 |
| Nov. 27... | 20 | 11 | 2 | ... | .. |
| Nov. 28... | 23 | 13 | 9 | 17 | 20 |
| Nov. 29... | 19 | 11 | 5 | 15 | .. |
| Nov. 30... | 19 | 10 | 5 | 14 | 17 |
| Dec. 1... | 19 | 10 | 4 | 14 | 16 |
| Dec. 2... | 18 | 10 | 3 | 13 | 16 |
| Dec. 4... | 24 | 13 | 7 | 15 | 19 |
| Dec. 5... | 24 | 14 | 7 | 15 | 20 |
| Dec. 6... | 40 | 20 | 11 | 16 | 20 |
| Dec. 7... | 99 | 72 | 44 | 54 | .. |
| Dec. 8... | 74 | 56 | 35 | 46 | .. |
| Dec. 9... | 62 | 44 | 28 | 41 | .. |
| Dec. 10... | 158 | 127 | 87 | 97 | .. |
| Dec. 11... | 140 | 111 | 103 | 107 | .. |
| Dec. 12... | 192 | 163 | ... | 168 | .. |
| Dec. 13... | 208 | 175 | ... | 187 | .. |
| Dec. 14... | 205 | 172 | ... | 203 | .. |
| Dec. 15... | 177 | 147 | ... | 173 | .. |
| Dec. 16... | 160 | 127 | ... | 147 | .. |

Hardesty Creek 2 cfs.
Birch Creek negligible

Averages from Nov. 18 to Dec. 5, inclusive.

Nursery Bridge 20
State Line 15
State Highway 18½

FILE COPY

No. [redacted]

Office Supreme Court, U. S.
FILED
JUL 22 1931
CHARLES ELMORE CROPLEY
CLERK

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

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THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## ORIGINAL BILL OF COMPLAINT IN EQUITY

---

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

*Attorneys for Complainant,*
*State of Washington.*

Office and Postoffice Address: Temple of Justice, Olympia, Wash.

JAY THOMAS, PUBLIC PRINTER

No. .....

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

## APPLICATION FOR LEAVE TO FILE ORIGINAL BILL OF COMPLAINT

Comes now the complainant in said cause by John H. Dunbar, attorney general for the state of Washington, and solicitor and counsel for the complainant, and makes this application of the said complainant for leave to file in this court the bill of complaint in said cause, and said complainant herewith presents the bill of complaint which it proposes to file.

JOHN H. DUNBAR,
*Attorney General of the State of Washington, and Solicitor and of Counsel for Complainant.*

No. .....

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

## ORIGINAL BILL OF COMPLAINT IN EQUITY

*To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:*

The State of Washington, by John H. Dunbar, attorney general of the state, under the direction of the Honorable Roland H. Hartley, governor of the state, and in compliance with the request of the Honorable Erle J. Barnes, director of the department of

conservation and development, and Mr. Chas. J. Bartholet, supervisor of hydraulics of the state, charged with the regulation and diversion of water in this state, by leave of this Honorable Court first had and obtained, brings this, its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the state of Oregon in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and respectfully sets forth and alleges as its cause of action:

That your orator is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

That the defendant the state of Oregon is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed and devolving upon each and all of said states of the United States of America.

That the Walla Walla river is a small non-navigable stream of water rising in the Blue Mountains

in the northeastern corner of the county of Umatilla in the state of Oregon, flowing thence first southwesterly and then northwesterly about twenty-five to thirty miles to the city of Milton, Oregon, thence in a northerly direction about five miles to the Washington-Oregon state line, thence northwesterly and westerly within the state of Washington a distance of about thirty miles, where it empties into the Columbia river.

That during the first twelve or fifteen miles of its course the said stream flows in a rugged mountainous country in a narrow canyon without any farming lands along its course. The remainder of the said stream, until it reaches Milton, Oregon, is in a narrow valley running from less than a quarter of a mile in width to a half of a mile in width, shut in by high hills. At or just above Milton, Oregon, the stream divides into two branches, one, locally known as the Tum-a-lum, and the other as the Little Walla Walla, which also divides into two branches known as the East Little Walla Walla and the West Little Walla Walla, all of which unite again about two miles after passing into the state of Washington. After the stream separates at or just above Milton, Oregon, it flows in a wide level valley. Several springs and small streams arise in this valley north of the city of Milton, Oregon, between the two branches, the waters of which springs and streams naturally flow into and join these two branches,

either before or after they pass into the state of Washington.

That the rainfall along the whole course of the stream in the state of Oregon is such that for the successful growing of fruit, alfalfa and vegetables, irrigation is needed, though grain crops may be grown without irrigation except on gravelly soil, and this is true for about five miles along its course in the state of Washington, but along the remainder of its course crops cannot be grown without irrigation except along the immediate border of the stream where the land is subirrigated; that the rainfall is about twenty-five inches a year in the foothills above Milton, Oregon, but gradually decreases westerly until it is about fifteen inches where such stream enters the state of Washington, and from there it continues to decrease until where the stream enters the Columbia river the rainfall is about six inches a year and the land is desert.

That the soil along the stream is a volcanic ash fairly heavy along the upper reaches of the stream and wherever low lands along the course of the stream or springs or spring branches are subirrigated therefrom, these subirrigated lands ordinarily need no irrigation, but the soil along the westerly and more desert portion is light but capable of raising abundant crops with irrigation; and that there are in the territory immediately north and west of Milton, Oregon, considerable tracts of land which are

mostly gravel, either from stream beds or wash therefrom during flood waters in former times.

That the water of the Walla Walla river comes from springs and from the melting of snow and rainfall in the Blue Mountains in which it rises, but after about the first of June of each year, very little of said flow comes from the melting of snow or rainfall directly and the springs which derive their supply from earlier snows and rains gradually decrease in flow so that ordinarily the flow in the latter part of July and during August of each year is greatly diminished in volume under that of the earlier months; that the flow of said stream varies from year to year with the amount of snow and rainfall in the mountains, but in normal years the flow of said stream varies from about 400 cubic feet per second in the early spring to about 150 cubic feet per second in late July and August. The flow thereof during the past eight or ten years has been decreasing owing to an increasing deficiency of rain and snowfall during said time until recently and the flow does not exceed two-thirds the normal flow.

That the lands riparian to said Walla Walla river both in Oregon and Washington were settled and segregated from the public domain mostly prior to the year 1870, the cultivation, however, being limited largely to the comparatively narrow strips of subirrigated land along the banks of the streams, except on the upper portions of the stream where, as hereinbefore alleged, grain crops could be grown

without irrigation, the existence of such subirrigated lands being the chief cause of such early settlement; that, commencing about 1870, water began to be used for irrigation on adjacent lands which were not subirrigated by said Walla Walla river or its branches, and such use gradually increased until by the year 1892 there were irrigated from said stream system about twelve hundred acres of land in the state of Oregon and about eighty-five hundred acres of land in the state of Washington. Of the latter, about seven thousand acres lie in the arid belt and will not grow crops without irrigation. That to properly irrigate the lands irrigated at such time, the full amount of the water flowing in such streams during the late summer months, when irrigation was necessary, was required. That said lands and particularly said about seven thousand acres are in a high state of cultivation, devoted to the growing of fruits, alfalfa and other crops, and furnish homes for a large number of people, to-wit: in excess of one thousand people, and in their present state of cultivation and improvement, together with the supply of water which they have heretofore and prior to the wrongful acts of defendants, its officers and citizens hereinafter set out, have been and would be of great value in excess of $20,000.00.

That since the year 1892, there have been additional lands put under irrigation in the state of Oregon from time to time so that more and more of the full flow of said streams during the summer months

have been taken therefrom and used upon lands in the state of Oregon, and more particularly has such use increased since about the year 1920; that the lands so irrigated have been located farther and farther away from the banks of such streams and the topography of the country is such that the waste and seepage water on such more distant lands does not return to the stream as was the case with earlier appropriations and uses; that, in addition thereto, the flood or excess waters of said streams in the early spring of the year were appropriated for early spring irrigation of large areas of land in the state of Oregon, all of which appropriations were subsequent to the appropriation and use of the waters of said streams in the state of Washington, and the appropriators of these flood waters increased from time to time their appropriations of such waters and, in disregard of the rights of the users of said waters in the state of Washington, extended their use of the waters of said streams beyond and after the flood waters had ceased to flow, thereby appropriating and using the waters to which the said lands in the state of Washington were and are entitled as well as lowering the water table along said stream and destroying the subirrigation of lands theretofore naturally subirrigated; that all of these diversions have been made under permits from the state of Oregon through its state engineer, which has thereby sanctioned and licensed the permanent wrongful use and consumption of said waters, and said state of Oregon,

through its said state engineer, threatens to and will continue to issue permits and licenses for further wrongful diversions of said waters; that in addition to such wrongful appropriations of the waters of said stream the said defendant, through its said state engineer, has fixed the duty of water, *i. e.*, the amount of water which each irrigated acre is entitled to receive during the irrigation season upon the lands in such state, at an excessive amount and far greater than necessary or proper, considering the rights of the users of the waters from said stream in the state of Washington, and such excessive duty of water and the use thereof by the residents of the state of Oregon have deprived and will continue to deprive the persons entitled to said waters in the state of Washington of the waters to which they are entitled.

That by reason of such acts, the prior appropriators of the waters from said stream in the state of Washington have been and are being deprived of sufficient water to properly irrigate their said lands, are unable to successfully grow crops, their perennial crops and orchards are being destroyed, and, unless the defendant, its officers and citizens are enjoined and restrained from continuing such wrongful diversion and from increasing the same, such lands in the state of Washington will be rendered wholly unproductive, to the great and irreparable injury of the owners of said lands and of this complainant.

Your orator further shows that the states of Oregon and Washington both recognize by their stat-

utes and the decisions of their highest courts the doctrine of riparian rights so that the owner of land riparian to the stream is entitled to his proportionate share of the waters flowing in such stream for the purpose of irrigation, subject to the requirement that such riparian use within a reasonable time and limiting such riparian right to such beneficial use, together with the doctrine of appropriation whereby the first appropriator in time is first in right subject only to previously acquired riparian rights, the amount of the appropriation being dated as of the time when the work was instituted for the putting of water to such beneficial use and to the extent that such water is applied to a beneficial use by the exercise of due diligence. That your orator is informed and believes that the lands to which water has been appropriated in recent years have been nonriparian lands or lands which have lost any riparian right by the failure to irrigate the same within a reasonable time.

That the state engineer of the state of Oregon is authorized by law to supervise the appropriation and distribution of the waters in such state; that request has been made upon him for an equitable division of the waters of said stream, but that he has refused to recognize the rights of the state of Washington and its citizens to any of the waters of said stream.

That the state of Oregon, unless restrained by this Honorable Court, will through its officials, agents, representatives, servants or other citizens or

residents or corporations continue to use and divert the waters of the Walla Walla river to which the citizens and state of Washington are justly entitled and to increase such use and diversion until the whole of said waters are diverted and the citizens and state of Washington deprived thereof during the irrigating season.

Your complainant, the state of Washington, offers to do full and complete equity to the state of Oregon in respect to the administration, diversion and use of the waters of the Walla Walla river and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrine of law or the constitution of the United States, has any authority or jurisdiction whatsoever to adjudicate upon said matters.

Your complainant has no adequate remedy at law, nor any remedy in any court whatsoever, except this supreme court of the United States, in respect to the matters and things herein set forth.

All of which actions, doings and pretenses of the said defendant, its officers, agents and citizens are contrary to equity and good conscience and tend to the manifest wrong, injury and oppression of your orator and its citizens in the premises. In consideration whereof and for as much as your orator is entirely remediless in the premises according to the strict rules of the common law and can only have relief in a court of equity where matters of this nature are properly cognizable and relievable;

To the end, therefore, that the defendant state of Oregon may, if it can, show why your orator should not have the relief hereby prayed for and may according to its best and utmost of its knowledge, information and belief, full, true and direct and perfect answer make to all and singular the matters hereinbefore stated and charged as fully and particularly as if the same were hereinafter repeated and they were thereunto distinctly interrogated (but not under oath, answer under oath being hereby expressly waived). Your orator prays this Honorable Court to issue its writ of subpoena in due form of law and according to the course and practice of the court directed to said defendant state of Oregon, commanding it to appear at a certain day and under certain pain and penalty therein to be specified to appear before this Honorable Court to answer all and singular the matters and things hereinbefore set forth (but not under oath, answer under oath being expressly waived) and to stand to perform and abide such order and decree therein as to Your Honors shall seem meet.

And your orator prays that this Honorable Court may exercise its sole jurisdiction over the determination of the respective rights of the states of Washington and Oregon and their citizens to the use of the waters of the Walla Walla river and its tributaries in said states; and determine and adjudicate such rights, and apportion the said waters in accordance with the rights thereto; that the defendant be enjoined and restrained from diverting or permit-

ting to be diverted and used in the state of Oregon any of the waters of said stream or streams to which the defendant and its citizens are found not to be entitled and that it be required to permit and cause to be permitted to flow into the state of Washington the waters of said Walla Walla river and its tributaries to which it and its citizens are found to be entitled, and that your orator may have all such other and further relief as the nature and circumstances of the case may require and as to this court shall seem just and equitable.

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

*Attorneys for Complainant,*
*State of Washington.*

STATE OF WASHINGTON,
County of Thurston. } *ss.*

JOHN H. DUNBAR, being duly sworn on his oath according to law, deposes and says: That he is the attorney general of the state of Washington and as such, at the direction and upon the request of the governor of said state, exhibits the foregoing bill of complaint; that he has read the said bill of complaint, and that the facts therein set forth, save and excepting where averred on information and belief, are true, and that as to the facts therein alleged as upon information and belief affiant is credibly informed and verily believes that the said facts are true.

JOHN H. DUNBAR.

Subscribed in my presence and sworn to before me this 23d day of April, 1931.

(Seal) Faith Y. Kaffenberger
*Notary Public in and for the State of Washington, residing at Olympia.*

FILE COPY

FILED
OCT 5 1931
CHARLES

Original No. 11

IN THE

# Supreme Court of the United States

IN EQUITY

OCTOBER TERM, 1930

THE STATE OF WASHINGTON,
*Complainant,*
*v.*
THE STATE OF OREGON,
*Defendant.*

**Answer to Original Bill of Complaint in Equity**

Original No. .....

IN THE

# Supreme Court of the United States

IN EQUITY

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OCTOBER TERM, 1930

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THE STATE OF WASHINGTON,
*Complainant,*
*v.*
THE STATE OF OREGON,
*Defendant.*

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**Answer to Original Bill of Complaint in Equity**

Comes now the defendant, the State of Oregon, by I. H. Van Winkle, Attorney General, with the approval of Honorable Julius L. Meier, Governor of the State of Oregon, and by leave of court first had and obtained, for answer to complainant's Bill of Complaint, filed herein at the October term, 1930, admits: That the state of Washington is one of the states of the United States entitled to enjoy all of the privileges, rights, and powers and with all of the duties, including the duty of protecting the rights, interests and properties of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

Admits that the defendant, the State of Oregon, is likewise one of the states of the United States entitled to enjoy all the privileges, rights, and powers, and with all the duties, including the duty of protecting the rights, interests and properties of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

This defendant admits that the Walla Walla river is a small non-navigable stream of water rising in the Blue mountains in the northeast corner of the county of Umatilla and state of Oregon, flowing thence, first, southwesterly and thence northwesterly about 25 or 30 miles to the city of Milton, Oregon, thence in a northerly direction about five miles to the Washington-Oregon state line, thence northwesterly and westerly within the state of Washington, a distance of about 30 miles, where it empties into the Columbia river.

This defendant denies that said Walla Walla river consists of only one branch or stream from its head to the city of Milton, Oregon, and alleges that for about 15 or 20 miles from its source said Walla Walla river is divided into two branches, one arising to the north of a steep and narrow ridge and known as the North Fork and the other to the south of said ridge and known as the South Fork; that said two streams unite at a point about

four miles east of the city of Milton; that each of said forks of said streams flows between high hills and the lands along said North Fork are farmed for a distance of about five miles east of said junction and the lands along said South Fork are farmed for a distance of about 10 miles east of said junction.

This defendant admits that the remainder of said stream from said junction until it reaches the city of Milton, is in a narrow canyon running from less than one-fourth of a mile in width to one-half mile in width and shut in by high hills.

This defendant denies that the Walla Walla river divides into two branches above the city of Milton; but admits that at said city of Milton it divides into two branches, one known as the Tum-a-lum and the other as the Little Walla Walla.

This defendant denies that the Little Walla Walla divides into two branches known as the East Little Walla Walla or the West Little Walla Walla in the state of Oregon and denies that said two streams unite again about two miles after passing into the state of Washington or elsewhere. That as a matter of fact, said Little Walla Walla divides at the city of Freewater in Umatilla county, Oregon, into two branches known as the Crockett branch and the Ford branch and said Crockett branch divides into the east and west

branches of the Crockett. That said east branch of the Crockett discharges into the east prong of the Little Walla Walla Spring branch which empties into the East Little Walla Walla across the line in the state of Washington and said Ford branch and the said west branch of the Crockett lead into the west prong of the Little Walla Walla Spring branch which empties into the West Little Walla Walla river across the line in the state of Washington; and defendant alleges that during the summer, or irrigation season of the year, no water is discharged into the Walla Walla river from the east or the west branches of the Crockett or from the Ford branch.

This defendant admits that after said stream separates at Milton, Oregon, it flows in a wide level valley and several springs and small streams arise in this valley north of the city of Milton between the two branches, the waters of which springs and streams naturally flow into and join the two branches either before or after they pass into the state of Washington; but the amount of flow or discharge from such springs or streams is limited during the summer and irrigation season of each year.

Defendant admits that the rainfall along the whole course of the stream in the state of Oregon is such that for the successful growing of fruit,

alfalfa and vegetables, irrigation is needed though grain crops may be grown without irrigation, except on gravel soil; but denies that this is only true for about five miles along its course in the state of Washington and alleges that grain can be and is successfully grown without irrigation for a distance of 10 or 12 miles along the course of said stream in the state of Washington westerly from where said Walla Walla river enters said state and that along the remainder of its course, crops can not be grown without irrigation except along the immediate border of the stream where the land is sub-irrigated.

This defendant admits that the rainfall is about 25 inches a year in the foothills above Milton, Oregon, but denies that the rainfall gradually decreases westerly until it is about 15 inches where said stream enters the state of Washington, but alleges that at said point it is not less than about 17½ inches and admits that from there it continues to decrease until where the stream enters the Columbia river the rainfall is about six inches a year and the land is desert.

Defendant admits the soil along the stream is a volcanic ash fairly heavy along the upper reaches of the stream and wherever low lands along the course of the stream or springs or spring branches are sub-irrigated therefrom, those sub-irrigated

lands ordinarily need no irrigation, but the soil along the westerly and more desert portion is light but capable of raising abundant crops with irrigation; and that there are in the territory immediately north and west of Milton, Oregon, considerable tracts of land which are mostly gravel, either from stream beds or washed therefrom during the flood waters in former times. But defendant denies that these are the only lands irrigated and subject to irrigation along said stream and its tributaries and the territory drained thereby in the state of Oregon that is rocky and gravelly and alleges that the lands along the North Fork and the South Fork of the Walla Walla river, and along the Walla Walla river above the city of Milton, and the lands lying along and adjacent to the said Walla Walla river, and the said Tum-a-lum and on and along the west prong of the Little Walla Walla river and the east prong of the Little Walla Walla river, Lewis Spring branch, Dry creek and a strip of land that extends for about four miles in a westerly direction from the Walla Walla river as it flows through Milton, Oregon, and for a distance of about two and one-half miles extending in a northerly direction from the bluff about four miles westerly from the city of Milton and the lands between the Tum-a-lum river and the Little Walla

Walla and the lands east of the said Tum-a-lum river in the state of Oregon, are gravelly or the greater portion thereof, and said gravelly soil permits excessive evaporation, seepage, and waste and such soil requires a higher duty of water than volcanic ash lands or sandy loam lands.

Defendant admits that the waters of the Walla Walla river come from springs from the melting of snow and rainfall in the Blue mountains in which it rises but after about the first of June of each year very little of said flow comes from the melting of snow or rainfall directly, and the springs which derive their supply from the earlier snow and rains, gradually decrease in flow so that ordinarily the flow in the latter part of July and during August of each year is greatly diminished in volume under that of the earlier months; that the flow of said stream varies from year to year with the amount of snow and rainfall in the mountains, but in normal years the flow of said stream varies from 400 cubic feet per second in the early spring, but defendant denies that it varies to about 150 cubic feet per second in late July or August or that the average mean flow of said stream is 150 cubic feet per second in late July or August or any greater amount than about 80 cubic feet per second during the last 8 or 10 years.

Defendant admits that the flow thereof during the past 8 or 10 years has been decreasing, owing

to the increasing deficiency of rainfall and snow during said time until recently, but defendant denies the flow does not exceed two-thirds the normal flow or that said flow amounts to two-thirds of the normal flow and alleges that in late July and August the same amounts to about 80 cubic feet per second of time.

Defendant admits that the lands riparian to said Walla Walla river both in Oregon and Washington were settled and segregated from the public domain mostly prior to 1870.

Defendant denies that the cultivation of lands along the banks of said streams was limited largely to comparatively narrow strips of sub-irrigated land along the banks of the stream or except on the upper portions of said streams or where grain crops could be grown without irrigation or that the existence of such sub-irrigated lands was the cause of such early settlement.

Defendant alleges that on and along said streams, their branches and tributaries in the state of Oregon during and prior to said 1870, there had been diverted and appropriated from said stream, its branches and tributaries in Umatilla county, Oregon, by means of ditches, dams, and headgates for stock, domestic, irrigation, and power purposes about 19 cubic feet per second of the water of said streams and the same had been

applied to power purposes or to the irrigation of about 700 acres of land which required the aid of artificial irrigation for the production of remunerative crops and said waters were then devoted and ever since have been applied to beneficial uses and purposes in the production of power, of grain, vegetables, alfalfa, fruits, pasture, shade and ornamental trees and the keeping up and maintaining of homes on said lands.

Defendant denies that about the year 1870 the waters of said stream or its tributaries first began to be used or that the same had not theretofore been used for irrigation on adjacent lands or on lands which were not sub-irrigated by said Walla Walla river or its branches, but said defendant admits that such uses gradually increased.

Defendant denies that about the year 1892 there were irrigated from said stream system only about 1,200 acres in the state of Oregon and defendant denies that in the year 1892 not more than 1,200 acres were irrigated from said stream in said state of Oregon; and alleges that in 1892 fully 5,831 acres of land were irrigated in Umatilla county, Oregon, from the waters of said stream and its tributaries.

Defendant denies that about 8,500 acres of land were irrigated or using water for the production of crops upon lands in the state of Wash-

ington at the end of or during the said year of 1892 or that any other or greater number of acres than 6,167.69 acres were irrigated from said stream or its tributaries in the state of Washington; and defendant alleges that of said 6,167.69 acres irrigated during 1892, 3,024 acres thereof lay along the Walla Walla river, the east and west branches of the Little Walla Walla, along Mud and Pine creek and that said lands are principally sub-irrigated from the waters of said streams and defendant further alleges that no part of said 7,000 acres in the arid belt was placed under irrigation until the year of 1898 when 80 acres were irrigated; that thereafter the reduction of said lands to cultivation was slow, small amounts being added from year to year to the irrigated portion thereof until the year 1907, when about 1,500 acres were under irrigation and thereafter about the year 1908 or 1909 said body of arid lands being short of water for irrigation and development purposes, entered into some arrangement with the city of Walla Walla, Washington, to divert the sewage waters of said city for use upon said arid tract; that those in charge of the reclamation of said tracts thereupon constructed a pipe line for a distance of about four and one-half miles from the city of Walla Walla which was about three feet in diameter to the said lands, and about the year

1912 said sewage water was first delivered thereto; that said pipe line carried about 16 cubic feet per second of water to said tract.

Defendant admits that said 7,000 acres of land lying in the arid belt in the state of Washington along the Walla Walla river will not grow crops without irrigation but defendant denies that to properly or at all irrigate said 7,000 acres of land in 1892 or any part thereof, the full or any amount of water flowing in such stream or streams during the summer months or when irrigation was necessary or any irrigation was necessary, was required; and defendant denies that said lands or any part thereof were irrigated at said time.

Defendant denies that said lands or particularly 7,000 acres or any greater number of acres than about 5,000 acres are in a high, or any state of cultivation or devoted to the growing of fruits, alfalfa, or other crops or furnishing homes for a large number of people or any number in excess of about 600 or that in their present or any state of cultivation or improvement or together with a supply of water they have heretofore or prior to the wrongful or any acts of the defendant or its officers or its citizens hereinafter or elsewhere alleged have been or would be of great value or any value in excess of $20,000 or any other sum.

Defendant admits that since the year 1892 there have been additional lands put under irrigation in the state of Oregon from time to time so that more and more of the full flow of said stream during the summer months has been taken therefrom and used upon lands in the state of Oregon.

Defendant denies that more particularly has such use increased since about the year 1920 or that lands so irrigated have been located farther away from the banks of said streams or that the topography of the country is such that the waste or seepage waters on such or any more distant lands does not return to the stream as was the case with the earlier appropriations or uses.

Defendant denies that in addition thereto the flood or excess waters of said streams in the early spring of the year were appropriated for early spring irrigation of large areas of land in the state of Oregon or that all or any of which appropriations were subsequent to the or any appropriation or use of the waters of said streams in the state of Washington or the appropriators of these flood waters increased from time to time their appropriation of such or any waters in disregard of the or any right or rights of the users of said or any waters in the state of Washington or extended the use of the waters of said stream beyond or after the flood waters ceased to flow or

thereby appropriating or using the or any waters to which the said or any lands in the state of Washington were or are entitled or as well as lowering the water table along the said or any streams or destroying the sub-irrigation of lands theretofore or at all sub-irrigated.

Defendant admits that diversions of water from said streams have been made under permits from the state of Oregon through its state engineer but alleges that since the year 1909 said permits have been issued and granted by said state engineer under and by virtue of a general law of the said state of Oregon.

Defendant denies said State of Oregon or its said state engineer sanctioned or licensed the permanent or any wrongful use or consumption of said or any water of said streams or that said State of Oregon through its state engineer or any one threatens to or will continue to issue permits or licenses for any wrongful diversions or use of said waters of said streams, further or otherwise.

Defendant further denies that in addition to such or any wrongful appropriations of the waters of said or any streams the said defendant through its said state engineer or anyone has fixed the duty of water, i. e., the amount of water which each irrigated acre is entitled to receive during the irrigation season upon the lands in said state

at an excessive amount or far or at all greater than necessary or proper considering the rights of the users of the water from said streams or any stream in the state of Washington or that said or any excessive duty of water or the use thereof by the residents of the state of Oregon has deprived or will continue to deprive the persons or any person entitled to said water in the state of Washington of the water to which they or any of them are entitled.

Defendant denies that by reason of such or any act or acts the prior or any appropriators of water from said or any stream or streams in the state of Washington have been or are being deprived of sufficient water to properly or at all irrigate their said or any lands, or are unable to successfully grow crops or that their perennial or any crops or orchards are being destroyed, or unless defendant, or its officers or citizens, or anyone, is or are enjoined or restrained from continuing such or any wrongful diversion, or from increasing the same, such or any land in the state of Washington or elsewhere, will be rendered wholly or at all unproductive to the great or irreparable injury of the owners of said or any lands or of this or any complainant.

This defendant, by way of further defense, alleges that the state of Washington, its municipal

corporations and people have increased from year to year without regard to the rights of former irrigators their irrigated acreage, and have unreasonably and excessively increased the amount of water taken from said stream and its tributaries, and have caused and are causing the loss and injury to the irrigators in the Walla Walla county, if they are suffering from a lack of sufficient water to irrigate their lands from the Walla Walla river and its tributaries as in former years.

Defendant further alleges that Walla Walla county, Washington, and that part thereof in which the Walla Walla river, Mill creek, Yellow Hawk, Garrison and Titus creeks, Cottonwood, Blue and Reser creeks, Russel, Pine, Mud and Little Mud, Doan and Stone creeks lie is in the same water shed as the Walla Walla river, the Tum-a-lum river and the tributaries of the said Walla Walla river and the said Tum-a-lum river upon the Oregon side of the state line between the state of Oregon and state of Washington; that all of said streams in the county of Walla Walla are tributaries of the said Walla Walla river or of some stream which leads into the said Walla Walla river in said county and state.

Defendant further alleges that Walla Walla is a municipal corporation having a population of

about 15,000 to 20,000 people; that said city appropriates and has used, for municipal purposes from the head waters of Mill creek, in the state of Oregon, which said stream is the principal tributary of the Walla Walla river in the state of Washington, from 22 to 28 cubic feet per second of water; that said water is conveyed away from the said Mill creek and not permitted to flow into the Walla Walla river with the other waters thereof, but consumed by said city for municipal purposes.

Defendant further alleges that there has been appropriated and used since the year 1919 in Walla Walla county, Washington, up to the end of the year 1926, water from the streams hereinbefore named for the irrigation of 3,490.76 acres placed under irrigation since 1919 in said county and state and that during said period of time only 1,573.98 acres of land have been placed under irrigation from the said Walla Walla river and its tributaries in the state of Oregon.

That the supervisor of hydraulics of the state of Washington, who is charged with regulation and diversion of the waters of said state, has established an excessive duty of water for use upon said lands in said state of Washington and has permitted and allowed the appropriators and users of water between said year 1919 and the latter part of the year 1926 to use one cubic foot per

second of the water of said streams for each 75 acres of land irrigated from April 1 to July 1 and one cubic foot of water per second to each 100 acres of land from July 1 to October 1 of each year, and from October 1 to April 1 of each year one cubic foot of water per second to each 50 acres of land so irrigated; that said irrigators in the state of Washington during the said time have increased their use and used a greater amount of water upon lands in said county of Walla Walla from said streams naturally tributary to the Walla Walla river than the state of Oregon or its people have increased their use or used from said stream and its tributaries in Umatilla county, Oregon, during said time.

That the state engineer of the state of Oregon who has charge of the distribution of the waters of the state of Oregon by permits has established the duty of water as one-half inch to the acre for the irrigation season in said territory and has made all permits granted since the year 1909 for the use upon lands irrigated under permits in the state of Oregon subject to all prior or existing rights; that in the year 1926 there was a greater quantity of acres irrigated in Walla Walla county, Washington, than in Umatilla county, Oregon, from the Walla Walla river and its tributaries; that in the state of Washing-

ton during said year there were 25,269 acres under irrigation and water had been alloted to each acre thereof; that 23,271 acres were farmed and irrigated while 2,018 acres were under existing ditches in various stages of development, and said duty of water adopted by the supervisor of hydraulics of the state of Washington applied to said lands so irrigated; and during said year the state of Oregon had but 18,269 acres under irrigation from said stream and its tributaries, all of which had been appropriated, diverted and used as hereinbefore alleged.

That development of a large body of land in Walla Walla county, Washington, known as the Attalia Project, was commenced about the year 1904, and approximately 2,400 acres thereof were placed under irrigation; that thereafter in the year 1926 two spans of a bridge carrying a flume across the Walla Walla river were destroyed during high water, thereby making it impossible to deliver any water to said land without the reestablishment of said flume; that in the same year, a section of earth fill to the dam at the point where water was diverted from the Walla Walla river for said Attalia Project, was washed out for a distance of about 150 feet, said fill being about 25 feet high; that neither said flume nor said fill has ever been replaced; that during the year 1931

only about 100 acres of said land have been irrigated by pumping direct from the river and from about 10 to 14 cubic feet per second of water, during the dry season of 1931 have flowed into the Columbia river and below said Attalia Project; and that neither the state of Washington, nor its people, are attempting to utilize said water, but are permitting the same to flow to waste; that at the mouth of the Touchet river, about nine miles up the Walla Walla river from the said Attalia Project, during the dry season of 1931 fully 20 cubic feet per second of water flowed to waste, that neither said state nor its people made any effort to apply the same to any beneficial use or purpose.

This defendant admits that the state of Oregon and the state of Washington both recognize by their statutes and the decisions of their highest courts the doctrine of riparian rights before 1909, but this defendant denies that the owner of land riparian to a stream in the state of Oregon is entitled to his proportionate share of the waters flowing in such stream for the purpose of irrigation or subject to any such requirements as that such riparian use within a reasonable time or limiting such riparian right to such beneficial use or together with the doctrine of appropriation whereby the first appropriator in time is first in

right, subject only to previously acquired riparian rights or that the amount of the appropriation is to be dated as of the time when the work was instituted for the putting of water to such beneficial use by the exercise of due diligence.

This defendant, by way of defense, alleges that in the year 1909, the legislature of the state of Oregon passed an act providing a system for the regulation, control, distribution and use of the waters of said state and such act provides that subject to existing rights, all waters within the state of Oregon may be appropriated for beneficial use, and that any person intending to acquire the right to beneficial use of any water shall, before commencing the construction of any ditch or other works, make application to the state engineer for a permit to make such appropriation. Said act also provides that any person who shall wilfully divert or use any water to the detriment of others without compliance with law, shall be deemed guilty of a misdemeanor; actual application of water to beneficial use prior to the passage of the act by or under authority of any riparian proprietor or of his or its predecessor in interest shall be deemed to create in such riparian proprietor a vested right to the extent of the actual application to beneficial use.

That since the passing of the act of 1909 by the legislature, the state of Oregon by its highest

tribunal has decided that "A settler upon a non-navigable stream has an election, either to rely upon his rights as a riparian proprietor or to make an appropriation of the water, if it is subject to appropriation, and claim as an appropriator" and "the right of appropriation is incompatible with the rule of riparian proprietorship. The doctrine of appropriation excludes the idea of equality and makes each water right superior to all others subsequently initiated * * * while the characterizing feature of riparian ownership, when applied to irrigation, is equality or, perhaps to speak more exactly, the right of each person is correlated with the right of every other person, although a riparian owner may take all the water in a stream if needed to satisfy domestic wants," and ever since such decision was made the rules there announced have been and are now the law of said state. It is further provided in said act that where any riparian proprietor or under his authority or under authority of his or its predecessor in interest, any person or corporation shall, at the time this act is filed in the office of the secretary of state be engaged in good faith in the construction of works for the application of water to a beneficial use, the right to take and use such water shall be deemed vested in such riparian proprietor provided such works shall be completed and said water devoted to a beneficial use within a reasonable time after the passage of this act, to be determined by the state

Defendant denies that the lands to which water has been appropriated in recent years have been non-riparian lands and, or lands which have lost any riparian right or rights by failure to irrigate the same within a reasonable time or at all.

This defendant admits that the state engineer of the state of Oregon is authorized by law to supervise the appropriation and distribution of the waters in said state, but this defendant denies that request has been made upon him for an equitable division of the waters of said stream, or any division thereof except one dictated by the state of Washington, its officers, servants, agents, and attorneys, and denies that he has refused to recognize the right of the state of Washington or its citizens to any of the waters of said stream and alleges the fact to be that said state engineer and the people of the state of Oregon permit and allow all and more of the water than that to which the state of Washington is entitled to flow across the line between the said two states without interference, and the said state of Washington is permitting and allowing the same to flow to waste and not applying the same to any beneficial use or purpose.

Denies that unless restrained by this Honorable Court, the state of Oregon will, through its officials, or agents, or representatives, or servants,

and other citizens, or other citizens and residents or residents and corporations or corporations continue to use or divert the waters of the Walla Walla river, or any part thereof, to which the citizens of said state of Washington, or either of them, are justly entitled, or to increase such use or diversion until the whole of said waters are diverted or the citizens or the state of Washington deprived thereof during the irrigation or any other season.

Denies that all or any actions or doings or pretenses of said defendant or its officers or agents or citizens are contrary to equity or good conscience or tend to the manifest or any wrong or injury or oppression of the state of Washington or its citizens or anyone in the premises.

This defendant by way of further defense to plaintiff's bill of complaint herein alleges that the greater part of the rights to the use of the waters of said Walla Walla river and its tributaries were adjudicated and determined more than 20 years ago by the courts of the said state of Oregon and said appropriators whose rights and interests therein were so determined have ever since held and still hold the waters of said streams pursuant to the provisions of said decree, and said rights are valuable property rights that have become vested in the individual appropriators and their successors under the constitution and laws of the

state of Oregon and of the United States, and plaintiff's bill of complaint is an attempt to deprive the owners thereof of their property rights therein, but neither the state of Oregon nor the United States are entitled to divest such owners of such property rights without due process of law.

That in the year 1888, 2,250 inches of the waters of said stream measured under a 6-inch pressure, miners' measurement, were appropriated for power purposes and in 1898 500 additional inches of water measured under said 6-inch pressure, miners' measurement, were appropriated for power purposes from said streams and other amounts of water were appropriated from said streams at various times both before and after said dates for power and irrigation uses, all of which were diverted at said times from the channel of the Walla Walla river and from the Tum-a-lum river and used for power and irrigation purposes in a northwesterly direction from said point of diversion and all said waters so diverted were discharged into the Little Walla Walla river, and thereafter flowed, and still continue to flow away from said main stream in such northwesterly direction from a point just below the forks of the Tum-a-lum and Walla Walla rivers in the city of Milton.

This defendant by way of a further defense to plaintiff's bill of complaint alleges that said Tum-a-lum river in early days carried the main flow of the waters of the Walla Walla river, but for about 40 years or more last past said Tum-a-lum river has been absolutely dry during the summer and irrigation season of each year from a point about four miles above the state line to a point about two miles above the said state line, but that water reappears in said stream about two miles above the state line on the Oregon side and flows from there down past the state line into the state of Washington, and said stream from the point where it so reappears is fed by many springs, seepage holes, and marsh spots.

This defendant, the State of Oregon, for a further defense to plaintiff's Bill of Complaint on file herein alleges that said state of Oregon and its people diverted, appropriated and used, in good faith, under a claim of right and color of title, pursuant to the laws of the state of Oregon, and the recognized custom of appropriating water from said streams in said territory, at said time, and applied to beneficial uses from about the year 1864 to 1893, water from said river and its tributaries for the irrigation of 5,831 acres of land and about 4,000 miners' inches measured under a 6-inch pressure for power purposes and have ever

since held and used said waters for said purposes, and from 1892 to 1909 6,712.73 acres and from 1908 to 1921 3,042.82, and from 1920 to 1927 1,573.98, and said appropriators have taken, used, held, and carried away the said waters of said stream openly, notoriously, and adversely to the state of Washington, its citizens and all the world since said dates hereinbefore alleged.

That during the times hereinbefore mentioned the said state of Oregon and its people have built dams, head-gates, main and lateral ditches, leveled and cultivated said lands, planted orchards, vineyards, pastures, lawns, meadows, alfalfa fields, ornamental and shade trees, and built and established homes upon the said lands, and constructed roads and highways thereto and therefrom, and expended enormous sums of money in doing the said work and making the said improvements, and during all of said times the said state of Washington and its people had notice and actual knowledge of said development, improvements, and expenditure of time, labor and money, and neither the said state of Washington nor its people have ever protested against the diversion, appropriation or use of the waters of said streams for the purposes hereinbefore enumerated, and by reason of the acts, conduct, and doings of the said state of Washington, its agents, servants, people and corporations, it and they are and ought to be

estopped from claiming or asserting that the state of Oregon or its people are or have been damaging them or any of them, or inflicting any wrong or injury upon them, or any of them, and estopped from asserting or claiming any right or interest in or to the waters of said stream so appropriated or used, and it and they ought to be estopped from interfering with the said appropriations or diversions from said streams or any of them.

That the states of Oregon and Washington both recognize by their statutes and the decisions of their highest courts the same principles of law as to adverse possession, laches and estoppel and the limitation of time within which real property may be recovered.

WHEREFORE, the State of Oregon, having fully answered the Bill of Complaint of the State of Washington, filed in the above entitled suit, prays that said suit be dismissed and that the state of Oregon have such other and further relief as to this Honorable Court may seem mete and equitable, including defendant's costs and expenses.

ISAAC H. VAN WINKLE,
Attorney-General,
JAMES A. FEE,
CHARLES Z. RANDALL,
GEORGE T. COCHRAN,
Special Counsel,
*Attorneys for Defendant.*

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CLERK

No. 11 Orig.

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

---

## REPLY OF COMPLAINANT TO ANSWER OF DEFENDANT

---

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

Office and Postoffice Address: Temple of Justice, Olympia, Washington.

JAY THOMAS, PUBLIC PRINTER, OLYMPIA

No.....

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

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THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

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## REPLY OF COMPLAINANT TO ANSWER OF DEFENDANT

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JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

Office and Postoffice Address: Temple of Justice, Olympia, Washington.

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IN THE

# SUPREME COURT

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UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

---

## REPLY OF COMPLAINANT TO ANSWER OF DEFENDANT

---

Comes now the complainant in said cause by John H. Dunbar, its attorney general and duly authorized counsel for said complainant, and by leave of court first had and obtained, hereby replies to affirmative matter contained in the answer of the defendant in said cause filed herein, as follows, to-wit:

The complainant admits the allegation of defendant on page 4 of its answer, that during the summer, or irrigation season of the year, no water

is discharged into the Walla Walla river from the east or the west branches of the Crockett or from the Ford branch so far as the present time is concerned and alleges that by means of dams and other controlling works, water has been in recent years diverted in the state of Oregon from the main stream into the Little Walla Walla river and into the various branches thereof and into other drainage channels and into irrigation ditches in that locality and the water of said main stream has thus been prevented from returning to the main channel of said Walla Walla river in the state of Washington at a point thereon above the principal diversions of said Walla Walla river in the state of Washington for the use of prior rights in said state of Washington, and the lands irrigated therefrom have been deprived of the use of said water.

Concerning the matters and things alleged in the last paragraph on page 8 and ending on page 9 of the answer of defendant, this complainant denies that about 700 acres or any greater number than approximately 70 acres of lands which required irrigation had been irrigated in the state of Oregon prior to 1870 and alleges that complainant has no knowledge or information as to appropriations in said state for power purposes, but alleges that waters if any appropriated for power purposes were all returned to the said Walla Walla river and its branches and flowed into the state of Washington undiminished in quantity by reason of such use.

Replying to the allegation on page 9 of the defendant's answer that in 1892 fully 5831 acres of land were irrigated in Umatilla county, Oregon, from the waters of said Walla Walla river and its tributaries, the complainant denies the same and denies that any number of acres were irrigated in said county from said stream in said year in excess of 1200 acres.

The complainant denies that 3024 acres of lands, or any other number of acres of lands, along the Walla Walla river, the east and west branches of the Little Walla Walla, along Mud and Pine creek are principally sub-irrigated from the waters of said streams, as alleged on page 10 of defendant's answer.

Replying to defendant's allegation on pages 10 and 11 of defendant's answer that a pipe line was constructed for a distance of about four and one-half miles from the city of Walla Walla for the carriage of sewage waters, said complainant admits that such pipe line was constructed, but denies that 16 cubic feet per second or any greater quantity than 5 cubic feet per second of sewage water was ever carried in said pipe line and alleges that said pipe line has been discontinued because unpractical.

The complainant denies that the state of Washington, its municipal corporations and people have increased from year to year without regard to the rights of former irrigators their irrigated acreage, and have unreasonably and excessively increased the amount of water taken from said stream and its trib-

utaries, and have caused and are causing the loss and injury to the irrigators in the Walla Walla county, as alleged on pages 14 and 15 of the defendant's answer.

For reply to the allegation on page 15 of defendant's answer, complainant denies that that part of Walla Walla county in which Mill creek, Yellow Hawk, Garrison and Titus creeks, Cottonwood, Blue and Reser creeks, Russel, Pine, Mud and Little Mud, Doan and Stone creeks lie is in the same watershed as the Walla Walla river, the Tum-a-lum river and the tributaries of the said Walla Walla river and the Tum-a-lum river in the state of Oregon and alleges that each of said streams is not in the same watershed as the Walla Walla river nor in the same watershed with respect to each other, and that they all empty into the said Walla Walla river in the state of Washington at points north of the north boundary of the state of Oregon, and none of the waters thereof are available for use in the state of Oregon.

Complainant denies that the water appropriated by the city of Walla Walla is conveyed away from the said Mill creek and not permitted to flow into the Walla Walla river with the other waters thereof, but consumed by said city for municipal purposes as alleged on page 16 of defendant's answer, and alleges that the residue thereof after use by the city is returned to said Mill creek and that none of such water could be used in the state of Oregon.

Complainant denies that there has been appropriated and used since the year 1919 in Walla Walla County, Washington, up to the end of the year 1926, water from the streams hereinbefore named for the irrigation of 3490.76 acres placed under irrigation since 1919 in said county and state, as alleged on page 16 of defendant's answer, but admits that a lesser number of acres, the exact amount of which is unknown to the complainant, has been placed under irrigation since 1919, and complainant alleges that the larger portion of such lands were not irrigated from said Walla Walla river or its tributaries in the state of Oregon or from waters which could be used in the state of Oregon; that the irrigation of such lands as were irrigated from said Walla Walla river or its tributaries in the state of Oregon at no time interfered with the irrigation of lands in the state of Oregon.

Concerning the allegation on page 16 of defendant's answer that during said period of time (1919 to 1926) only 1573.98 acres of land have been placed under irrigation from the said Walla Walla river and its tributaries in the state of Oregon, the complainant has not sufficient information or knowledge to form a belief, and therefore denies the same.

Complainant denies that the supervisor of hydraulics of the state of Washington has established an excessive duty of water for use upon said lands in the state of Washington, as alleged on page 16 of defendant's answer; complainant also denies that

said supervisor has permitted and allowed the appropriators and users of water between said year 1919 and the latter part of the year 1926 to use from October 1 to April 1 of each year one cubic foot of water per second to 50 acres of land so irrigated, as alleged on pages 16 and 17 of defendant's answer, the complainant alleges that the period prescribed by said supervisor for the use of one cubic foot of water per second to each 50 acres of land is from October 1 in one year to April 1 of the next, the period of the winter and spring run-off in the streams involved. Said complainant further alleges that rights with priorities of 1919 and later years have been used only after rights of earlier priorities have been satisfied from the streams involved.

For reply to the allegation on pages 17 and 18 of defendant's answer that in the state of Washington during said year (1926) there were 25,269 acres under irrigation and water had been alloted to each acre thereof; that 23,271 acres were farmed and irrigated while 2,018 acres were under existing ditches in various stages of development, the complainant alleges that of said lands irrigated in the year 1926 only 6,000 acres approximately received water during the summer irrigation season; that the balance of said irrigated lands having rights of late priorities relatively received water only intermittently during the winter and spring run-off in the streams involved when a supply of water was available for their use or partial use. Replying to the allegations of defend-

ant on page 18 as to the number of acres of land irrigated in Walla Walla county from the Walla Walla river and its tributaries, complainant alleges that of the lands so alleged to be irrigated in said Walla Walla county, Washington, not to exceed 11,000 acres are irrigated from the Walla Walla river or its tributaries from which waters are or can be taken for irrigation in the state of Oregon, and of those so irrigated a considerable portion were irrigated solely during the ordinary non-irrigating season, when the waters would otherwise flow to waste; that concerning the allegation on page 18 of defendant's answer that during said year of 1926 the state of Oregon had but 18,269 acres under irrigation from said stream and its tributaries, all of which had been appropriated, diverted and used as hereinbefore alleged, the complainant has not sufficient knowledge or information to form a belief and therefore denies the same.

Replying to the allegations of said answer in the second paragraph on page 18 continuing to page 19, complainant denies that any of the water involved in this suit is permitted to run to waste and alleges that complainant has no exact information as to the amount of water flowing in the Walla Walla river at or below the mouth of the Touchet river, but alleges that such water is all return and seepage water from said Walla Walla river, Mud creek, Pine creek and the Touchet, which had been put to a beneficial use and that no part of such waters can be used for

irrigation of lands in the state of Oregon or of any lands in the state of Washington by any feasible means.

The complainant admits that amounts of water diverted from the Walla Walla river and from the Tum-a-lum river for power and irrigation purposes have been discharged into the Little Walla Walla river, as alleged on page 24 of defendant's answer but complainant denies that said waters flowed and still continue to flow away from said main stream in such northwesterly direction from a point just below the forks of the Tum-a-lum and Walla Walla rivers in the city of Milton, and alleges that such waters have reached, and will reach, unless wrongfully diverted, the main stream of said Walla Walla river above the principal diversions thereon in the state of Washington.

The complainant denies that for about 40 years or more last past said Tum-a-lum river (the local name in the Milton-Freewater district for main channel of the Walla Walla river) has been absolutely dry during the summer and irrigation season of each year from a point about four miles above the state line to a point about two miles above the said state line but complainant admits that at short intervals within the last ten years citizens of Oregon have diverted all of the water of the stream at a point just above the Tum-a-lum section of the Walla Walla river, the period of diversion varying according to the season, and complainant alleges that in no

year during the last 40 years or more has the whole supply of water of said section of the Walla Walla river been diverted during the entire summer and irrigation season.

Concerning the allegations on pages 23 and 24 of defendant's answer that the greater part of the rights to the use of the waters of said Walla Walla river and its tributaries were adjudicated and determined more than 20 years ago by the courts of the said state of Oregon and said appropriators whose rights and interests therein were so determined have ever since held and still hold the waters of said streams pursuant to the provisions of said decree and said rights are valuable property rights that have become vested in the individual appropriators and their successors under the constitution and laws of the state of Oregon and of the United States, the complainant has not sufficient knowledge or information to form a belief as to the amount of these rights, their nature or their use for more than 20 years and, therefore, denies the same and each and all of said allegations and said complainant denies that said rights, if any or whatever their nature may be, are vested as against the complainant or its inhabitants, in this action and said complainant denies that the plaintiff's bill of complaint is an attempt to deprive the owners thereof of their property rights or any other rights therein.

For reply to the second paragraph beginning on page 25 of defendant's answer relating to adverse user, complainant denies that said state of Oregon

and its people diverted, appropriated and used in good faith or under claim of right or under color of title or pursuant to the laws of the state of Oregon or the recognized custom of appropriating water from said streams in said territory at said time or applied to beneficial uses from about the year 1864 to 1893 water from said river and its tributaries for the irrigation of 5,831 acres of land or any other number of acres of land and about 4,000 miners' inches measured under a 6 inch pressure or any other number of miners' inches measured under a 6 inch pressure or any other pressure and have ever since held and used said waters for said purposes, and from 1892 to 1909, 6,712.73 or any other number of acres and from 1908 to 1921, 3,042.82 or any other number of acres and from 1920 to 1927, 1,573.98 or any other number of acres. Complainant denies that said appropriators have taken, used, held and carried away the said waters of said stream openly or notoriously or adversely to the state of Washington or to its citizens or to all the world since said dates in said answer alleged or since any other dates.

Concerning the matters and things alleged in the second paragraph beginning on page 26 of the defendant's answer, the complainant has not sufficient knowledge or information to form a belief and, therefore, denies the same and every matter, allegation and thing in said paragraph contained, and the complainant specifically denies that during the times alleged in the defendant's answer neither the state of

Washington nor its people have ever protested against the diversion, appropriation or use of the waters of said streams for the purposes enumerated in the defendant's answer and said complainant specifically denies that by reason of the acts or conduct or doings of the said state of Washington or its agents or servants or people or corporations or by any other reason it or they are or ought to be estopped from claiming or asserting that the state of Oregon or its people are or have been damaging them or any of them or estopped from asserting or claiming any right or interest in or to the waters of said streams so appropriated or used and denies that it or they ought to be estopped from interfering with the said appropriations or diversions from said streams or any of them.

WHEREFORE, the complainant having made full reply to the answer of the defendant herein prays for judgment as prayed for in its original bill of complaint on file in said cause.

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

No.....

IN THE

# SUPREME COURT

OF THE

## UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

---

## PROOF OF MAILING REPLY.

---

*STATE OF WASHINGTON* } ss.
*County of Thurston*

The undersigned being first duly sworn on oath deposes and says that on the..... day of....., 1932 at Olympia, Washington, he deposited in the United States Postoffice in sealed envelopes, one addressed to "Mr. Isaac H. Van Winkle, Attorney General, Salem, Oregon," one addressed to each "Mr. James A. Fee and Mr. Charles Z. Randall, Pendleton, Oregon," and one addressed to "Mr. George T. Coch-

ran, LaGrande, Oregon," true copies of the Reply of Complainant to Answer of Defendant in the above entitled cause.

.....

Subscribed and sworn to before me this.....

day of....., 1932.

.....

*Notary Public, residing at*

....., Washington.

My commission expires.....

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CHARLES ELMORE C
Clerk

No. 11 Original

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

## MOTION TO STRIKE AFFIRMATIVE DEFENSES

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,

*Attorneys for Complainant,*
*State of Washington.*

Office and Postoffice Address: Temple of Justice, Olympia, Washington.

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No. 17 Original

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

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OCTOBER TERM, 1930.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## NOTICE.

*To the State of Oregon, Defendant above named, and to Isaac H. Van Winkle, James A. Fee, Charles Z. Randall, and George T. Cochran, Attorneys for said Defendant:*

You will please be advised that on Monday the 21st of March, 1932, the complainant will submit to the consideration of the court its motion to strike, a copy of which is attached.

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant.*

Dated February 17, 1932.

No. 17 Original

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

---

OCTOBER TERM, 1930.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## MOTION TO STRIKE AFFIRMATIVE DEFENSES

---

Comes now the complainant above named and moves the court to strike out each of the following affirmative defenses to the original bill of complaint, contained in the printed answer of the defendant, to-wit:

Complainant moves to strike that portion at page 23, reading as follows:

"This defendant by way of further defense to plaintiff's bill of complaint herein alleges that the greater part of the rights to the use of the waters of said Walla Walla river and its tributaries were ad-

judicated and determined more than 20 years ago by the courts of the said state of Oregon and said appropriators whose rights and interests therein were so determined have ever since held and still hold the waters of said streams pursuant to the provisions of said decree, and said rights are valuable property rights that have become vested in the individual appropriators and their successors under the constitution and laws of the state of Oregon and of the United States, and plaintiff's bill of complaint is an attempt to deprive the owners thereof of their property rights therein, but neither the state of Oregon nor the United States are entitled to divest such owners of such property rights without due process of law."

Complainant moves to strike that portion at page 25, reading as follows:

"This defendant, the State of Oregon, for a further defense to plaintiff's Bill of Complaint on file herein alleges that said state of Oregon and its people diverted, appropriated and used, in good faith, under a claim of right and color of title, pursuant to the laws of the state of Oregon, and the recognized custom of appropriating water from said streams in said territory, at said time, and applied to beneficial uses from about the year 1864 to 1893, water from said river and its tributaries for the irrigation of 5,831 acres of land and about 4,000 miners' inches measured under a 6-inch pressure for power purposes and have ever since held and used said waters for said purposes, and from 1892 to 1909 6,712.73 acres and from 1908 to 1921 3,042.82, and from 1920 to 1927 1,573.98, and said appropriators have taken, used, held, and carried away the said waters of said stream openly, notoriously, and adversely to the state of Washington, its citizens and all the world since said dates hereinbefore alleged."

Complainant moves to strike that portion at page 26, reading as follows:

"That during the times hereinbefore mentioned the said state of Oregon and its people have built dams, head-gates, main and lateral ditches, leveled and cultivated said lands, planted orchards, vineyards, pastures, lawns, meadows, alfalfa fields, ornamental and shade trees, and built and established homes upon the said lands, and constructed roads and highways thereto and therefrom, and expended enormous sums of money in doing the said work and making the said improvements, and during all of said times the said state of Washington and its people had notice and actual knowledge of said development, improvements, and expenditure of time, labor and money, and neither the said state of Washington nor its people have ever protested against the diversion, appropriation or use of the waters of said streams for the purposes hereinbefore enumerated, and by reason of the acts, conduct, and doings of the said state of Washington, its agents, servants, people and corporations, it and they are and ought to be estopped from claiming or asserting that the state of Oregon or its people are or have been damaging them or any of them, or inflicting any wrong or injury upon them, or any of them, and estopped from asserting or claiming any right or interest in or to the waters of said stream so appropriated or used, and it and they ought to be estopped from interfering with the said appropriations or diversions from said streams or any of them."

Complainant moves to strike that portion at page 27, reading as follows:

"That the states of Oregon and Washington both recognize by their statutes and the decisions of their highest courts the same principles of law as to adverse possession, laches and estoppel and the

limitation of time within which real property may be recovered."

Said motions are made for the reason that each and all of said affirmative defenses and each and all of the allegations and conclusions therein contained are incompetent, irrelevant and immaterial to any issue in said cause and are legally insufficient to constitute a defense to said bill of complaint, and complainant prays that each and all of said defenses as above set forth be stricken out and taken for naught, and that, upon determination of this motion by the court, the complainant be given a reasonable time in which to file its reply to the answer of the defendant.

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant.*

## GENERAL STATEMENT.

The motions to strike are in the nature of demurrers to each of said defenses on the ground that each is not sufficient as a matter of law to constitute a defense to the original bill of the complainant. For the purpose of determining the legal sufficiency of each of these defenses as challenged in the motions, all properly pleaded facts in the answer may be assumed to be true.

The state of Washington has submitted herein its original bill against the state of Oregon stating in substance, among other things, that the state of Oregon through its state engineer has authorized and is authorizing a wrongful encroachment by landowners with junior rights in the state of Oregon upon senior rights of the state of Washington and its citizens in and to the waters of the Walla Walla river, an interstate stream rising in the state of Oregon and flowing into and through a part of the state of Washington, so that the prior appropriators from said stream in the state of Washington have been and are being deprived of sufficient water properly to irrigate their lands, asking that the rights of the state of Oregon be determined, offering to do equity in the premises and praying that the state of Oregon and its officers and citizens be enjoined from such wrongful acts and for general relief. (Bill pp. 9-14.)

The state of Oregon in its answer, after denying generally the principal allegations of the bill as to the

charge of wrongdoing, sets up three affirmative defenses to which the complainant objects in the motions involved herein.

VESTED RIGHTS.

The first of these defenses alleges among other things (Answer p. 23) that the greater part of the rights to the use of the water of the Walla Walla river in the state of Oregon have become vested in the individual appropriators and that the plaintiff's bill of complaint is an attempt to deprive the owners of their property rights which cannot be done without due process of law.

ADVERSE USE.

The second of these affirmative defenses alleges in substance (Answer p. 25-26) that the state of Oregon and its people have diverted, appropriated and used in good faith, under a claim of right and color of title, pursuant to the laws of the state of Oregon from the year 1864 certain amounts of water in the answer specified, and ever since have held and used said water openly, notoriously and adversely to the state of Washington, its citizens and all the world.

ESTOPPEL.

The third of these affirmative defenses alleges in substance that during the period above specified the state of Oregon and its people have built homes upon the lands irrigated from the river and have expended enormous sums of money in making improvements;

that during all this period the state of Washington and its people had notice and actual knowledge of these improvements and of the expenditure of time, labor and money and that neither the state of Washington nor its people have ever protested against said diversion, appropriation or use of the waters of said stream; that by reason of the acts, conduct and doings of the state of Washington, its people and corporations, it and they are and ought to be estopped from claiming or asserting that the state of Oregon or its people are or have been damaging them or inflicting any wrong or injury upon them and estopped from asserting or claiming any right or interest in the waters so appropriated or used and it and they ought to be estopped from interfering with said appropriations or diversions.

The motions will be discussed in the order stated.

It is thought that a determination of the rules of law applicable to each of the three affirmative defenses herein moved against will greatly clarify the scope and nature of the evidence required of the parties to this cause in support of their respective claims.

## ARGUMENT.

### I.

### Vested Rights.

The allegation of the defendant's answer that owners of property cannot be deprived of vested rights without due process of law is correct as an abstract statement, but has no bearing on the present suit. This suit was brought for the express purpose of determining the rights to the waters of the Walla Walla river. How can a claim of vested rights be a defense to such a suit?

An interstate stream is a heritage common to all the states through which it flows. Such a stream cannot be treated for the purpose of determining the relative rights of the states through which it flows as a system of independent segments according to its course in each state, but as a whole. The rights of the several states interested in such a stream are correlative.

*Kansas v. Colorado,* 206 U. S. 46, 51 L. Ed. 956;

*Wyoming v. Colorado,* 259 U. S. 419, 66 L. Ed. 999;

*New Jersey v. New York,* U. S. Sup. Ct., Adv. Op. 1930-31, No. 14, p. 648;

*Connecticut v. Massachusetts,* U. S. Sup. Ct., Adv. Op. 1930-31, No. 9, p. 297.

The laws and courts, therefore, of one state cannot confer on itself or its citizens, as vested rights, rights which do not belong to it but belong to another sovereign state.

In the cases of *Kansas v. Colorado,* 206 U. S. 46, *supra, New Jersey v. New York, supra,* and *Connecticut v. Massachusetts, supra,* the common law rights of riparian owners to have a stream flow undiminished in volume which would be a vested right was relied on and in each case this court refused to recognize such right as between the states.

In the case of *New Jersey v. New York, supra,* Justice Holmes, speaking for the court in denying this claim said:

"We are met at the outset by the question what rule is to be applied. It is established that a more liberal answer may be given than in a controversy between neighbors members of a single state. *Connecticut v. Massachusetts,* February 24, 1931 (— U. S. —, ante, 297, 51 S. Ct. 286). Different considerations come in when we are dealing with independent sovereigns having to regard the welfare of the whole population and when the alternative to settlement is war. In a less degree, perhaps, the same is true of the quasi sovereignties bound together in the Union. A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it. New York has the physical power to cut off all the water within its jurisdiction. But clearly the exercise of such a power to the destruction of the interest of lower States could not be tolerated. And on the other hand equally little could New Jersey be permitted to require New York to give up its power altogether in order that the river might come down to it undiminished. Both States have real and substantial interests in the River that must be reconciled as best they may be. The different traditions and practices in different parts of the country may lead to varying results but the effort always is to secure an equitable apportionment without quibbling over formulas.

See *Missouri v. Illinois,* 200 U. S. 496, 520, 50 L. ed. 572, 578, 26 S. Ct. 268; *Kansas v. Colorado,* 206 U. S. 46, 98, 117, 51 L. ed. 956, 975, 983, 27 S. Ct. 655; *Georgia v. Tennessee Copper Co.,* 206 U. S. 230, 237, 51 L. ed. 1038, 1044, 27 S. Ct. 618, 11 Ann. Cas. 488; *Wyoming v. Colorado,* 259 U. S. 419, 465, 470, 66 L. ed. 999, 1013, 1015, 42 S. Ct. 552; *Connecticut v. Massachusetts,* February 24, 1931 (— U. S. —, ante, 297, 51 S. Ct. 286)."

The inhabitants of one state have no vested rights which can be set up as a basis for preventing the supreme court of the United States from determining the respective rights between two states.

See also, *Georgia v. Tennessee Copper Co.,* 206 U. S. 230, 237, 51 L. ed. 1038, 1044.

## II.

### Adverse Use.

The defendant by its allegation on page 25 of its answer, heretofore quoted, alleges that it has rights by adverse use as against the state of Washington.

It is elementary that adverse use or the statute of limitations does not run against a state, the ancient maxim being, *"Nullum Tempus Occurrit regi."*

36 Cyc. 910;
37 C. J. 710;
*Iowa v. Carr,* (C. C. A.) 191 Fed. 257.

In the case of *Missouri v. Illinois,* 200 U. S. 496, 519, 50 L. ed. 572, 578, Justice Holmes observes, with respect to the question of prescription as applied to a public nuisance, as follows:

*"The reasons on which prescription for a public nuisance is denied or may be granted to an individual as against the sovereign power to which he is subject have no application to an independent state.* Oppenheim Int. Law, 293, Secs. 242, 243. It would be contradicting a fundamental principle of human nature to allow no effect to the lapse of time, however long. *Davis v. Mills,* 194 U. S. 451, 457. Yet the fixing of a definite time usually belongs to the legislature rather than the courts. The courts did fix a time in the rule against perpetuities, but the usual course, as in the instances of statutes of limitation, the duration of patents, the age of majority, etc., is to depend upon the law making body." (Italics ours.)

Waters running in a natural stream belong to the public. The modern expression is that such waters are owned by the state in trust for the people.

*Murphy v. Kerr,* 296 Fed. 536, 540;
*Marks v. Hilger,* 262 Fed. 302, 304;
*Pulaski Irr. Ditch Co. v. Trinidad,* 70 Colo. 565, 203 P. 681, 682;
*Coulson v. Aberdeen S. C.,* 39 Ida. 320, 227 P. 29.

In the instant case the state of Washington is therefore claiming an interest in the waters of the Walla Walla river in its sovereign capacity as a state of the Union. As well stated by Justice Holmes in the case of *Georgia v. Tennessee Copper Co.,* 206 U. S. 230, 237, *supra*:

"This is a suit by the state for an injury to it in its capacity of quasi sovereign. In that capacity the state has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain."

See also, *North Dakota v. Minnesota,* 263 U. S. 365, 373, 68 L. ed. 342, 345.

Manifestly the laws of the state of Washington have no extraterritorial effect in the state of Oregon and vice versa, and state statutes of limitations have no application.

It is alleged on page 27 of the defendant's printed answer that the states of Oregon and Washington both recognize by their statutes and the decisions of their highest courts the same principles of law as to adverse possession, laches and estoppel and the limitation of time within which real property may be recovered.

It should be remembered, however, that there is no law in the state of Washington recognizing rights in water by adverse use as against the state.

Even under the facts disclosed by the allegations of the complainant's bill and the defendant's answer thereto, the strict doctrine of private adverse use is inapplicable to the instant case.

It is agreed by both parties to the instant suit that the quantity of the waters of the Walla Walla river during the last 8 or 10 years has been decreasing owing to the increasing deficiency of rainfall and snow.

On page 7 of the complainant's printed bill it is alleged as follows:

"The flow thereof (Walla Walla river) during the past eight or ten years has been decreasing owing to an increasing deficiency of rain and snowfall dur-

ing said time until recently and the flow does not exceed two-thirds the normal flow."

The answer of the defendant to this allegation is shown on page 7 of the defendant's printed answer and is as follows:

"Defendant admits that the flow thereof (Walla Walla river) during the past 8 or 10 years has been decreasing owing to the increasing deficiency of rainfall and snow during said time until recently, but defendant denies the flow does not exceed two-thirds the normal flow, or that said flow amounts to two-thirds of the normal flow and alleges that in late July and August the same amounts to about 80 cubic feet per second of time."

It is also conceded by both parties to the instant action that there has been a gradual increase of the use of the waters of the Walla Walla river by the citizens of both states involved in this controversy, at least since the year 1870. (Complainant's Bill, page 8, Defendant's Answer, page 9.)

While the number of users of water of the stream is not specifically alleged, the reasonable inference to be drawn from the pleadings is that the number of persons involved in the use of the water of said stream is great.

We then have a situation in the instant case where the uses of the water of the stream in question have gradually increased from year to year and the natural supply of the stream has diminished from year to year, and where the number of water users is large and located in each of the states concerned.

Some of the elements necessary to be proved to sustain rights by adverse use are lacking in such a situation. Rights by adverse use are individual. A court of equity does not recognize group rights by adverse use. They cannot be acquired wholesale. One, or more, of the elements of hostility, notoriety, uninterruption and exclusiveness, is always lacking in a general use of water by numerous persons in ever varying extent, and during constantly changing periods of time.

Judge Whitson in the case of *Morris v. Bean,* 146 Fed. 423, describes the difficulties involved in the application of the rule of adverse use as between private parties in the following language (page 433):

"The statute of limitations is applied by analogy in courts of equity to that relating to the possession of real estate. It never runs upon a scrambling possession. It presupposes adverse, exclusive, and uninterrupted possession under a claim of right. The claim must be hostile to that of the person against whom it is asserted. The aid of the statute has occasionally been invoked with success in cases of this character, but not under conditions similar to those of this case.

"The defendants made their first diversions of water in 1893. A few of them have brought themselves barely within the statutory period. It often happens that persons who are takers of water from a stream gradually enlarge their diversions until they begin to deprive the first appropriators of the amount to which they are entitled. The taking is so gradual, and the enlargement of the use so imperceptible, that it is impossible to fix a time when it begins to be adverse. This is not an unusual situation, and it is presented by the testimony here. The

quantity of water in this stream varies greatly from spring floods to low water in the fall. Most small streams are subject to this variation. The flow of water varies also with the seasons, depending largely upon the amount of snowfall or rain in the mountains. It is manifestly impracticable to apply the statute of limitations to such a state of affairs, and in this case particularly it could not apply, because the defendants have not had the uninterrupted use of the water for the statutory period. It is shown that they at times turned the water down, upon demand of the complainant. They have gradually increased their diversions, and just at what point they encroached upon the rights of the complainant and the intervener cannot be determined from the testimony, and just how long it has continued cannot be ascertained; but it is clear that they did not do so to any considerable extent until after the year 1893, and this suit was brought in 1903. As to real estate the possession is easily discovered. It is susceptible of actual proof, but here it is not shown that either the complainant or intervener were ever entirely deprived of water. During the flood time water always reached them. They had the use of it for a time, some years longer than others. Who can divine with definiteness just what amount of water the defendants used to the exclusion of the complainant or intervener, or how long it was used to their exclusion each year? The burden is upon the defendants to bring themselves within the statute, and the proof must be clear before a prescriptive right will be enforced. The claim cannot prevail under the conditions disclosed. *Last Chance Ditch Co. v. Heilbron,* (Cal.) 26 Pac. 523; *Fogarty v. Fogarty,* (Cal.) 61 Pac. 570; *Boyce v. Capper,* (Or.) 61 Pac. 642; *Huston et al. v. Bybee,* (Or.) 20 Pac. 51; Long on Irrigation, Secs. 90-91-92."

This decision was affirmed on appeal to the United States Supreme Court.

*Bean v. Morris,* 221 U. S. 485, 55 L. ed. 821.

It is submitted, therefore, that the doctrine of adverse use has no application to a suit between quasi sovereign states; that in any event it has no application to the situation involved in the instant case, and that the defense based thereon and set up in the defendant's answer to the bill of the complainant is legally insufficient to constitute a defense to said bill.

## III.

### Estoppel.

The third allegation (p. 26 of the answer) attacked by complainant's motion attempts to set up an estoppel as a defense.

Again we have that universal rule that "estoppel and laches do not operate against a state and no procrastination of public officials prejudices the state and their tardiness neither bars nor defeats the state from vindicating its sovereign rights except where positive statute so provide."

*State ex rel. Veale v. Paul,* 113 Kans. 289, 214 P. 425.

See also:

*Iowa v. Carr,* 191 Fed. 257, 266;
*State v. Hutchins,* 79 N. H. 132, 105 Atl. 519;
*People v. Brown,* 67 Ill. 435, 438.

In the case last cited the rule is stated in the following language:

"It is a familiar doctrine, that the state is not embraced within the statute of limitations, unless specially named, and, by analogy, would not fall

within the doctrine of estoppel. Its rights, revenues and property would be at fearful hazard, should this doctrine be applicable to a state. A great and overshadowing public policy of preserving these rights, revenues and property from injury and loss by the negligence of public officers, forbids the application of the doctrine. If it can be applied in this case, where a comparatively small amount is involved, it must be applied where millions are involved, thus threatening the very existence of the government.

"The doctrine is well settled that no *laches* can be imputed to the government, and by the same reasoning which excuses it from *laches,* and on the same grounds, it should not be affected by the negligence or even wilfulness of any one of its officials."

Under the rule above stated, the state's rights in public waters cannot be conveyed or impaired by an estoppel growing out of mere failure to object to encroachments.

That the state is acting in its sovereign capacity in bringing this suit has already been shown in the discussion under the head of "Adverse Use" and need not be restated.

Moreover, even as between private persons, the answer fails to show an estoppel. Inaction, which is the only ground shown, is never of itself sufficient to create an estoppel.

21 C. J., Estoppel, sec. 154, p. 1150.

The answer to this contention is well stated in the case of *Morris v. Bean, supra,* 146 Fed. 423, 433, as follows:

"It is safe to say that few cases of this character have been tried where the defense of estoppel has

not been interposed with result uniformly unsuccessful. The estoppel argued for here is that the parties now seeking to assert their rights ought not be allowed to do so, because they knew that the defendants were building up their improvements, and relying upon the use of the water to maintain them. An all sufficient answer to this is that the defendants knew also that the complainant and intervener were relying upon the same water to maintain their improvements already made, and to carry on their farming operations already begun. Under this view of it, the one side is as much estopped as the other."

Affirmed *Bean v. Morris,* 221 U. S. 485, 55 L. ed. 821.

See also:

*Holbrook Irr. Dist. v. Arkansas Val. S. B. & I. L. Co.,* 42 Fed. (2d) 541, 546.

## CONCLUSION.

The three affirmative defenses attacked in this motion tend to confuse the real issues in the controversy. If not stricken, evidence would be offered and the question of its exclusion would then come before the master or the court, but, even if excluded, the cost of securing and producing the witnesses would have to be borne, so that complainant deemed it the better practice to present these questions by a motion to strike, believing them to be well taken.

Respectfully submitted,

JOHN H. DUNBAR,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

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IN THE

# Supreme Court of the United States

OCTOBER TERM, 1930

**Original No. 11**

**IN EQUITY**

THE STATE OF WASHINGTON, COMPLAINANT,

*v.*

THE STATE OF OREGON, DEFENDANT.

## Defendant's Brief in Opposition to Motion to Strike Affirmative Defenses

I. H. VAN WINKLE,
Attorney General,
JAMES A. FEE
CHARLES Z. RANDALL,
GEORGE T. COCHRAN,
Special Counsel,
*Counsel for Defendant.*

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IN THE

# Supreme Court of the United States

OCTOBER TERM, 1930

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Original No. 17

IN EQUITY

THE STATE OF WASHINGTON, COMPLAINANT,

*v.*

THE STATE OF OREGON, DEFENDANT.

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## Defendant's Brief in Opposition to Motion to Strike Affirmative Defenses

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## STATEMENT

The state of Washington has filed a motion to strike certain portions of the answer filed by Oregon. Such a motion "cannot ordinarily take the place of or be used interchangeably with a demurrer." 49 C. J. 686, § 975.

"A motion to strike out a pleading as an entirety cannot be sustained where one or more of the counts, defenses, or paragraphs therein are sufficient. So a motion to strike a paragraph or count for irregularity should be denied if any portion of it is relevant or responsive." 49 C. J. 692 and 693, § 983 (4), and notes 55, 56 and 57 citing cases from 16 states and the U. S. courts.

Such is the direct holding of the U. S. C. C. A., ninth circuit, in the case of *Bunker Hill, Etc., Co. v. Polak*, 7 Fed. (2nd) 583, 585 (Certiorari denied 269 U. S. 581; 70 L. Ed. 423).

Washington's brief and motion are directed against certain portions of Oregon's answer which it is claimed set up the defenses of: First—Vested Rights; Second—Adverse Use; and Third—Estoppel.

## THEORY OF THE CASE

The brief accompanying the motion is upon the theory that because the state of Washington is the complainant the rules governing the determination of the relative rights to the use of the water of the stream are essentially different from those which would apply if the case were between individuals.

### I.

In a controversy between states as to the relative rights to the use of the waters of an interstate stream, the "Complainant State" brings its suit in its quasi-sovereign capacity as "parens patriae, trustee, guardian, or representative" of that portion of its citizens whose rights are affected.

*Kansas v. Colorado*, 206 U. S. 46, 99; 51 L. Ed. 956, 975.
*North Dakota v. Minnesota*, 263 U. S. 365, 375, 376; 68 L. Ed. 342, 346.
*Krall v. United States*, 79 Fed. 241.
*Larsen v. Johnson et al.*, (Ariz.) 203 Pac. 874.

II.

In such a suit the rights of the state are "indissolubly linked with the rights of the appropriators" and "their situation and what has been accomplished by them cannot be ignored."

*Wyoming v. Colorado*, 259 U. S. 419, 468; 66 L. Ed. 999, 1015.

III.

In such a suit the rights of the appropriators must be determined as though the accident of the state line did not exist and all of the appropriations had been made in a single state.

*Wyoming v. Colorado*, 259 U. S. 419, 470, 471; 66 L. Ed. 999, 1016.

## VESTED RIGHTS

We are taught by the case of *Wyoming v. Colorado* that the doctrine of appropriation must furnish the basis for the decision of this case.

The doctrine of appropriation recognized in both states (Complainant's Bill, page 11) is a doctrine of vested rights.

"To appropriate water means to take and divert a specific quantity thereof and put it to beneficial use in accordance with the laws of the state where such water is found, and, by so doing, to acquire under such laws, a vested right to take and divert from the same source, and to use and consume the same quantity of water annually forever, subject only to the right of prior appropriations."

*Arizona v. California*, 283 U. S. 423, 459; 75 L. Ed. 1154, 1168.

Oregon has alleged that she has done this, in the paragraph on page 23 of Oregon's answer, against which Washington has moved.

Since Washington has asked for the determination of the relative rights to the use of the waters in controversy, an allegation on the part of Oregon as to the existence of certain vested rights in her citizens is manifestly pertinent to the issues and goes to the merits of the controversy.

It is true that this allegation is followed by a statement to the effect that the bill filed by Washington is an attempt to deprive the owners of their property rights without due process of law and that neither the United States nor the state of Washington can do this.

Possibly this statement is a conclusion of the pleader.

If so, it does not render the entire paragraph subject to the motion to strike. The allegations as to the existence of the rights are pertinent. Under the rule as set forth at the beginning of this brief the motion must be denied if any part of the paragraph moved against is pertinent.

> "Ordinarily a pleading is not rendered wholly insufficient because it contains legal conclusions in addition to the facts which properly belong in it. In other words the addition of a conclusion of law which may be legitimately drawn from the facts pleaded will not invalidate the pleading. A conclusion of law at variance with, or unsupported by, the facts stated cannot be relied on, and must yield to the conflicting averments of fact. A statement of legal conclusions, together with the facts supporting them, con-

stitutes at most mere surplusage, and is not ground for demurrer, although the pleading is subject to a motion to make more definite and certain, or to strike out the conclusion of law."

49 C. J. 48 and 49, § 19(3), and cases cited in notes 27 to 34 citing cases from the United States courts and from almost every state in the Union.

This is directly held by the U. S. C. C. A., seventh circuit, in the case of *In Re Marion Mfg. Co.*, 1 Fed. (2nd) 903.

In the case at bar the conclusion of the pleader does not render the paragraph moved against insufficient, and because the paragraph contains pertinent allegations the motion as against this paragraph must fail.

## ADVERSE USER

The authorities cited in the brief of the state of Washington under this head on pages 14 to 19 of the brief are not in point in a case in this Court between two sovereign states.

They have application only to a suit by a subject against a sovereign.

The distinction is pointed out by the Court in *Commissioners v. Buckner*, 48 Fed. 533, 536, where it is said:

"The states of this Union, as between each other, or as between them and the United States, are not excepted from acts of limitations as to bringing suits by the application of this maxim." (Nullum tempus occurrit regi.)

Furthermore, this Court has applied the doctrine of acquisition of title by prescription and adverse possession as against the sovereign states of this Union in the following cases:

*Indiana v. Kentucky*, 136 U. S. 479, 510 to 511; 34 L. Ed. 329, 333.

*Maryland v. West Virginia*, 217 U. S. 1, 41 to 43; 54 L. Ed. 645, 657 to 658.

*Louisiana v. Mississippi*, 202 U. S. 1, 53; 50 L. Ed. 913, 932.

These cases are decided not only on the basis of what the states had done but also what their citizens had done and the acts of the citizens were considered in determining the rights of the state.

As ruled in the case of *Wyoming v. Colorado*, supra, the rights of the state are "indissolubly linked with the rights of the appropriators." (259 U. S. 468, 66 L. Ed. 1015.)

It is alleged in the answer, page 27, that both the states of Oregon and Washington by statute and decisions recognize the same principles of law as to adverse possession, laches, and estoppel, and limitation of time within which real property may be recovered. For the purpose of this motion this allegation must be deemed admitted. Entirely aside from this technical admission the state of Washington has recognized that the right to the use of water may be acquired by prescription in the following cases:

*Smith v. Nechanicky*, 211 Pac. 880-882; 123 Wash. 8.
*City of Raymond v. Willapa Power Co.*, 167 Pac. 914-916; 98 Wash. 317.
*Allen v. Roseburg*, 126 Pac. 900; 70 Wash. 422.
*Berryman v. East Hoquiam, Boom & Logging Co.*, 124 Pac. 130; 68 Wash. 657.
*Farwell v. Brisson*, 119 Pac. 814, 66 Wash. 305.

The decisions of the Supreme Court of the state of Oregon also recognize this rule.

The same principles which led this court to hold in the case of *Wyoming v. Colorado*, supra, that the doctrine of appropriation should be applied to the dispute because recognized by the courts and statutes of both states would warrant the application to this case of the doctrine that water rights may be acquired by adverse possession and prescription.

That being true, if the citizens of the state of Oregon have acquired by prescription and adverse user the right to use any waters formerly claimed by the state of Washington, that right must of necessity be recognized by this Court in determining their relative rights.

In the case of *Wyoming v. Colorado*, this court recognized that the rights of the respective states to the use of the water of an interstate stream rested upon the right of the individual appropriators and that the right of these appropriators and what has been done and accomplished by them must be considered.

"These constituted the foundation of all rural home building and agricultural development. If they were re-

jected now the lands would return to their naturally arid condition, the efforts of the settlers and the expenditures of others would go for naught and values mounting into large figures would be lost." (259 U. S. 468, 66 L. Ed. 1015.)

It follows then that the allegations in that portion of page 25 to which the motion is directed and which are to the effect that the state of Oregon and its citizens "diverted, appropriated, and used under a claim of right and color of title pursuant to the laws of the state of Oregon and the recognized custom of appropriating waters from said stream in said territory at said time and applied to beneficial uses," certain quantities of water with certain priorities and that the appropriators had "taken, used, held, and carried away the said waters of said stream openly, notoriously, and adversely to the state of Washington, its citizens and all the world since the dates hereinbefore alleged" are allegations of the facts upon which the rights of the appropriators in Oregon depend.

It cannot be held that such an allegation is not pertinent to the issues nor can it be held that such is an allegation merely of adverse user. It is an allegation of the appropriation which must be the basis of the decision of the rights of the people of the state of Oregon. It is therefore pertinent to the matter in issue, and, under the authorities cited at the beginning of this brief, even if the words "openly, notoriously, and adversely" be taken as conclusions of the pleader, the motion could still not be allowed because of the allega-

tions of the pertinent fact included in the paragraph moved against. We do not think these words constitute conclusions. They are descriptive of the method of use and are allegations of the ultimate fact in that respect. What these citizens did is the basis of their rights and that of the state of Oregon. The dates of priority are important since under the doctrine of appropriation which is the basis of the decision in this case, this court has held "the cardinal rule of that doctrine is that priority of appropriation gives superiority of right." (259 U. S. 470, 66 L. Ed. 1015.)

## ESTOPPEL

The complainant has moved to strike a portion of page 26 of the answer. This portion alleges in substance that the people of the state of Oregon have expended large amounts and constructed valuable works and improvements with the notice and knowledge of the state of Washington and its people and in reliance upon the appropriations of water made from this stream, and that neither the state of Washington nor its people ever protested against the diversion, appropriation, or use of the water, and that by reason of their conduct they are estopped from claiming any right in the waters or its use, or from interfering with the appropriations or diversions from this stream.

This paragraph alleges that these things were done during all of the dates alleged in the answer which is from 1864 down to date.

We thus have an allegation that the people of Oregon appropriated and used the water, went to great expense in reliance upon that use, developed large tracts of land and built homes, and roads, all upon the faith of the appropriations and with the actual knowledge of Washington and its citizens and that this continued without protest on the part of the state of Washington from 1864 down to the present time.

Under such circumstances the individual appropriators in Washington would be estopped. "Equity will not restrain the wrongful diversion of a stream when a land owner permitted the defendant to proceed with the erection of works and diversions of the water at very heavy expense, without taking any legal steps to prevent it for so long a period as seven years." (Farnham, Waters and Water Rights, Vol. 2, p. 1673, § 508.)

"The lower owner may lose the right to relief by permitting the upper owner to make large expenditures to effect the diversion of the water, under the belief that he is acting within his legal rights." (Farnham, Waters and Water Rights, Vol. 2, p. 1672, § 508.)

"Upon the question of silence operating as an estoppel, the authorities are not quite harmonious. The true rule, as we view the subject, is that unless the silence upon the part of the owner can be construed as a consent or at least an acquiescence, an estoppel will not be worked. Of course, if the silence is continued for the full period of the statute of limitations as a bar to an action for the recovery of real property, by the

laches of the owner, and the adverse possession and user of the one seeking a right, a prescriptive right may be acquired."

Kinney on Irrigation and Water Rights, 2d Ed., Vol. 2, p. 2037, § 1127.

Particularly is this true as to the claim of the state of Washington for injunctive relief.

The authorities cited by the state of Washington in their brief under this head are, like the authorities upon adverse possession, not in point. They apply only to cases between a subject and a sovereign and do not apply to cases brought in the United States courts between two states.

Under the case of *Wyoming v. Colorado*, supra, the measure of Washington's rights is the rights acquired by the citizens. If its citizens have lost their rights by an estoppel, Washington has correspondingly lost its right.

Furthermore, it will be observed that the case of *Wyoming v. Colorado* is decided partly upon a consideration as to what had been done by the diversion of water in the state of Colorado. It is therefore pertinent for the state of Oregon to allege what it is doing and what it has done by means of diversion of water in the state of Oregon. That being true, so much of the paragraph as refers to what has been accomplished by the use of the water is pertinent to the issue. Since a portion of the matter moved against is pertinent, the motion must fail as to this paragraph under the authority first cited in this brief.

The state of Washington, acting, as it is, to protect the rights of its citizens cannot escape the results of the conduct of those citizens in the past. It has a direct bearing and effect upon the extent of those citizens' rights.

That part of page 27 of the answer against which the motion is directed is an allegation that the states of Oregon and Washington both recognize in their statutes and decisions the same principles of law as to adverse possession, laches, estoppel, and limitation.

The case of *Wyoming v. Colorado*, supra, is authority for the proposition that where the two states both recognize the same doctrine by their statutes and their decisions the doctrine will be applied to controversies between the states. In so ruling the Court held: "Each of these states applies and enforces this rule in her own territory and it is the one to which intending appropriators would naturally turn for guidance. The principle on which it proceeds is not less applicable to interstate streams and controversies than to others. Both states pronounce the rule just and reasonable as applied to the natural conditions in that region." (259 U. S. 470, 66 L. Ed. 1015, 1016.) This reasoning applies with equal force to the paragraph of the pleading under discussion. Since both states recognize these rules, there is no reason why they should not be applied in these proceedings. They are the rules which have governed appropriations of water in the Western states since the doctrine of appropriation was first originated.

They are the rules which govern the rights of the individual appropriators in each state. They are the rules which govern all the appropriations made from this stream. It cannot be supposed that they would be applied in determining the relative rights of the Oregon appropriators and of the Washington appropriators in their respective states and that their application would then stop at the state line.

This controversy is essentially a proceeding to determine the relative rights between all of the appropriators from this stream. No different rules will be applied in determining such rights than if the appropriators were all in one state.

The state of Washington appears only for the protection of the rights of its citizens. There is no magic worked by the appearance of the state as complainant. The rights of the state depend upon the rights acquired or lost by its citizens. These rights must be determined under the laws and customs applicable and in force in the territory concerned.

Respectfully submitted,

I. H. VAN WINKLE,
Attorney General,

JAMES A. FEE,
CHARLES Z. RANDALL,
GEORGE T. COCHRAN,
Special Counsel,

*Counsel for Defendant.*

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IN THE

# SUPREME COURT

OF THE

UNITED STATES

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NO. 11 ORIGINAL

OCTOBER TERM, 1932.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## RETURN TO RULE TO SHOW CAUSE

---

G. W. HAMILTON,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

Office and Postoffice Address: Temple of Justice, Olympia, Washington.

JAY THOMAS, PUBLIC PRINTER, OLYMPIA

IN THE

# SUPREME COURT

OF THE

UNITED STATES

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NO. 17 ORIGINAL
OCTOBER TERM, 1932.

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## RETURN TO RULE TO SHOW CAUSE

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G. W. HAMILTON,
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IN THE

# SUPREME COURT

OF THE

UNITED STATES

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NO. 17 ORIGINAL
OCTOBER TERM, 1932.

---

THE STATE OF WASHINGTON,
*Complainant,*
v.
THE STATE OF OREGON, *Defendant.*

---

## RETURN TO RULE TO SHOW CAUSE

---

*To the Honorable, the Supreme Court of the United States*

The State of Washington, complainant in the above entitled suit, does hereby make return to the rule and order to show cause why the above entitled case should not be dismissed for want of prosecution and for cause why said case should not be dismissed and respectfully shows to the honorable court:

That the above entitled suit was instituted in good faith for the purpose of securing an adjudication of the rights to the use of the waters of the Walla Walla river, an interstate stream, between the state of Washington and its citizen users of the waters of

said stream and the state of Oregon and its citizen users of the waters of said stream on the other; that at the time of the commencement of said suit the dates of appropriation and priority of the users of the waters of such stream in the state of Washington and the amount to which each was entitled had been, as between themselves, adjudicated in the state of Washington by a decree of the superior court of Walla Walla county, Washington, and adjudication proceedings had been pending before the circuit court of the state of Oregon for Umatilla county for a determination of priorities and rights of the users of the waters of said stream in the state of Oregon, as between themselves, for more than a year and all the testimony relating thereto had been taken, and it was anticipated that very shortly after the institution of the present suit a decree determining such priorities and rights would be filed in the circuit court of Umatilla county, Oregon, in which such stream was located; that after consultation with the attorneys for the state of Oregon it was deemed advisable in the interest of economy and clearness to await the entry of such decree and thereupon stipulate such priorities and other matters as might be agreed upon; that contrary to expectations said circuit court did not enter its final decree adjudicating such water rights until the 16th day of May, 1932; that certain of the claimants to such waters, not being satisfied with such decree, appealed from the same to the supreme court of the state of Oregon, where said cause was not decided

until December 13, 1932 (*In re Waters of Walla Walla River,* see 16 Pac. (2d) 939).

That the taking of the testimony in the adjudication of the water rights in said stream in the state of Washington with certain tributaries occupied a period of three months, and the taking of the testimony in the adjudication of the water rights in said stream and its tributaries in the state of Oregon occupied a like or longer period, both due to the fact that the lands involved were in small tracts, making the number of claimants in each instance very large and the expense of taking such testimony very great; and it was felt by the attorneys for the state of Washington that, upon the entry of the decree in the Oregon court finally adjudicating the water rights in that state, it was probable that in a great portion of the cases the priorities between the users in the two states could be stipulated and the issues so narrowed as to eliminate a large portion of the expense and in the end an earlier determination of the present suit be reached, and this seemed to be concurred in by the attorneys for the state of Oregon; that the delay caused by the failure of the circuit court of Umatilla county, Oregon, to enter its decree and the taking of the appeal from such decree and the additional delay caused thereby were not anticipated since no appeal was taken from the decree of the superior court of Walla Walla county, Washington, adjudicating such waters; and it still is complainant's belief that the course pursued was the best suited to the situation;

that, in addition to the above situation, it seemed best to counsel for both states that additional studies be made for the purpose of determining the duty of water, the flow of seepage and such matters which might aid in a solution of the matter before the court, and both the state of Washington and the state of Oregon have, during the irrigating season of 1932, had studies made of these matters and such studies have been made by experts from the United States Department of Agriculture engaged in similar work in Washington and Oregon and loaned to the respective states for such purpose, together with other men familiar with such matters, such investigators working in cooperation with each other; that because of the other work in which the investigators for the state of Washington have been engaged, their reports were delayed and have just been received.

That notwithstanding the taking of the appeal to the supreme court of the state of Oregon from the decree of adjudication by the circuit court of Umatilla county, Oregon, counsel for the state of Washington were having their assistants check over the report of the state engineer of Oregon and the decree of said circuit court so as to be prepared as soon as possible after any decision in the supreme court of Oregon to take up with counsel for the state of Oregon the question of the stipulation hereinbefore referred to.

In addition, it was suggested by the state of Oregon that additional investigations and studies be

made over a period of years. This, however, after a thorough discussion and conference, was not agreed to and counsel for the state of Washington, deeming that a master should now be appointed, were preparing an application for such appointment which is filed with this answer.

That both states have expended considerable money in making the investigations hereinbefore described and in otherwise preparing for a trial of this cause, and the issues involved are of great importance to the two states concerned and their inhabitants and a dismissal would result in hardship and loss.

WHEREFORE, the complainant prays that the rule and order to show cause why said cause should not be dismissed be vacated and dissolved and that petitioner's application for the appointment of a master be considered and granted.

G. W. HAMILTON,
*Attorney General,*

JOHN C. HURSPOOL,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Attorneys for Complainant,*
*State of Washington.*

STATE OF WASHINGTON, }
County of Thurston. } ss.

G. W. HAMILTON, being duly sworn on his oath according to law, deposes and says: That he is the attorney general of the state of Washington and who, as such, at the direction and upon the request of the governor of said state, instituted the foregoing suit and makes the foregoing return to rule to show cause; that he has read the return and that the facts therein set forth, save and excepting where averred on information and belief, are true, and that as to the facts therein alleged as upon information and belief affiant is credibly informed and verily believes that the said facts are true.

G. W. HAMILTON

Subscribed in my presence and sworn to before me this 31st day of January, 1933.

JENNIE M. TATTERSALL,
Notary Public in and for the State of Washington, residing at Olympia.

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IN THE

# SUPREME COURT

OF THE

# UNITED STATES

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OCTOBER TERM, 1930

NO. 17, ORIGINAL

//

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THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

---

## REPORT OF THE SPECIAL MASTER

---

WILLIAM W. RAY,
*Special Master.*

ARROW PRESS, 62 W. SECOND SOUTH, SALT LAKE

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IN THE

# SUPREME COURT

OF THE

# UNITED STATES

OCTOBER TERM, 1930—NO. 17, ORIGINAL

THE STATE OF WASHINGTON,
*Complainant,*
v.
THE STATE OF OREGON,
*Defendant.*

**Submission of the Report of the Special Master.**

In the cause entitled The State of Washington v. The State of Oregon, being No. 17 Original, October Term, 1930, this Honorable Court appointed me as Special Master by its order dated February 20, 1933, as follows:

> "The return of the complainant to the rule issued herein to show cause why this case should not be dismissed for the want of prosecution, is received and filed.
>
> "The motion for the appointment of a special master is granted, and it is ordered that William W. Ray, Esquire, of Salt Lake City, Utah, be, and he is hereby, appointed special master in this cause, with authority to summon witnesses, issue subpoenas, and to take such evidence as may be introduced and such as he may deem it necessary to call for. The master is directed to make findings of fact and conclusions of law, and to submit the same to this Court with all convenient speed, together with his recommendations for a decree. The findings, conclusions and recommendations of the master shall be subject to consideration, revision or approval by the Court. The master shall be allowed his actual expenses and a reasonable compensation for his services to be fixed hereafter by the Court. The allow-

ances to him, the compensation paid to his stenographic and clerical assistants, and the cost of printing his report shall be charged against and be borne by the parties in such proportions as the Court hereafter may direct. If the appointment herein made of a master is not accepted, or if the place becomes vacant during the recess of the Court, the Chief Justice shall have authority to make a new designation which shall have the same effect as if originally made by the Court herein."

Pursuant to the above order, and at the request of both parties, I heard the case on stipulations of fact and oral testimony. I held public hearings as follows:

Portland, Oregon, April 3, 1933.
Walla Walla, Washington, August 23 and 24, 1933.
Portland, Oregon, February 12, 1934.
Walla Walla, Washington, March 26, 27, 28, 29, 30, 31, April 2, 3, 4, 5 and 6, 1934;

at which hearings the parties appeared before me as Special Master by their respective counsel, presented their evidennce, consisting of 1195 pages and forty-seven exhibits, and thereafter submitted to me abstracts of the testimony and briefs with respect to findings of fact, conclusions of law and recommendations for a decree which they respectively desired made in the case.

Pursuant to the above order of this court, I have reported the testimony and the exhibits received by me as Special Master by the filing of the same in the office of the Clerk of this Court, with my certificate; and I hereby submit to the Court my findings of fact, conclusions of law and recommendations for a decree.

Respectfully submitted,

WILLIAM W. RAY,
*Special Master.*

IN THE

# SUPREME COURT

OF THE

# UNITED STATES

OCTOBER TERM, 1930
NO. 17, ORIGINAL

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON,
*Defendant.*

## REPORT OF THE SPECIAL MASTER

### THE PLEADINGS

The State of Washington, on July 22, 1931, filed, with leave of court, its bill of complaint in the Supreme Court of the United States. In response to process duly served, the State of Oregon, October 5, 1931, filed its answer to said bill of complaint, to which answer a reply was filed May 2, 1932.

The purpose of the suit, as disclosed by the allegations of the complaint, and the relief sought, is to have this court determine the relative rights of the states of Washington and Oregon to the use of the waters of the Walla Walla River and its tributaries, a non-navigable interstate stream flowing

within both states, and to enjoin the State of Oregon from continued interference with the rights of the State of Washington.

**Bill of Complaint.**

The bill of complaint alleges that the Walla Walla River is a non-navigable stream rising in the Blue Mountains in the Northeastern corner of Umatilla County, State of Oregon, and flowing thence northwesterly about thirty miles within the State of Oregon to the Washington-Oregon line, and thence northwesterly for a distance of about thirty miles within the State of Washington to its juncture with the Columbia River; that the first twelve or fifteen miles of the river is through a narrow canyon with no irrigable lands adjacent to the stream; that the remainder of the river in Oregon is bordered with irrigable lands; that the stream divides into several designated branches within the State of Oregon, which branches are the recipients of the waters arising in small streams and springs adjacent to such branches; that it is necessary to the production of successful crops that the lands along the stream be irrigated; that a like condition obtains as to much of the land along the stream in Washington; that certain soils available to irrigation from the river will produce abundantly when irrigated; that the waters of the Walla Walla River come from springs and from the melting of snow and the rainfall in the Blue Mountains; that after about June first of each year, because of the melting of the snow and the want of sufficient rainfall, the flow of the river is dependent upon springs; that as a result the amount of stream flow in late July and August is much less than during the earlier months; that the stream flow is variable from year to year, but that in normal years the early spring flow is about 400 cubic feet

per second of time and in late July and August about 150 cubic feet per second; that due to drought prevailing during the past eight or ten years the stream flow has been only about two-thirds of the normal amount; that the lands riparian to the Walla Walla River both in Oregon and Washington were settled and segregated from the public domain mostly prior to 1870, but that the cultivation of land prior to 1870 was largely confined to sub-irrigated lands lying along the banks of the stream; that about 1870 there commenced the use of water upon lands along the river which required irrigation, and that such use gradually increased until in 1892 there were so irrigated in Oregon about 1200 acres of land and about 8500 acres of land in Washington; that of the 8500 acres of land being farmed in Washington at least 7000 acres were of such character and so situated that they required irrigation for the production of crops; that in 1892 the irrigated areas had so increased that it required all of the flow of the Walla Walla River and its tributaries during the late summer months to properly irrigate such lands; that the 7000 acres of land in the State of Washington are in a high state of cultivation devoted to the growing of fruits, alfalfa and other crops, and furnish homes for more than one thousand people and have a value, except for the fact that they are deprived of water by the wrongful acts of the State of Oregon, in excess of $20,000; that since 1892, and particularly since 1920, additional lands have been put under irrigation in the State of Oregon, which lands have drawn water from the flow of the Walla Walla River during the low water season; that said new lands put under irrigation in Oregon have been located at greater distances from the stream where the topography of the country is such that the waste and seepage water no longer returns to the stream; that the flood waters occurring

in the early spring are now diverted for the irrigation of large areas of land in the State of Oregon under appropriations subsequent to the Washington appropriations and that the appropriators of flood waters extend their use of waters of said stream beyond and after the flood water period, thereby depriving the State of Washington of water to which it is entitled and lowering the ground water table and destroying the sub-irrigation of land in the State of Washington; that such diversions and uses have been made under permits from the State of Oregon and that the State Engineer of the State of Oregon threatens to and will continue to issue further permits and license further wrongful diversion of the waters of said river within the State of Oregon; that in addition thereto the State of Oregon has fixed and permitted an excessive duty of water in disregard of the rights of the users of water in the State of Washington, which excessive use deprives the water users in the State of Washington of water to which they are entitled; that thereby the water users in the State of Washington have been and are being deprived of sufficient water to properly irrigate their lands and are unable to successfully grow crops, and that unless the wrongful conduct of the State of Oregon shall be restrained, lands in the State of Washington will be rendered wholly unproductive, to the great and irreparable injury of the State and its land owners; that the State of Washington and the State of Oregon each by their statutes and the decisions of their courts recognize the doctrine of riparian rights, so that the owner of land riparian to a stream is entitled to his proportionate share of the waters of such stream for the purpose of irrigation, subject to the requirement that such riparian user shall beneficially apply such water within a reasonable time; that each of said states further recognizes the doctrine of appropriation whereby

the first appropriator in time is first in right, subject only to vested riparian rights; that the amount of the appropriation is fixed as of the time when the work necessary to put the water so appropriated to a beneficial use is initiated, accompanied with due diligence; that the more recent developments in Oregon have been on non-riparian lands; that the State Engineer of the State of Oregon is empowered to supervise the appropriation and distribution of waters within such state, and that the State of Washingon has requested of said State Engineer an equitable division of the waters of said stream, which request has been denied; that unless restrained the State of Oregon will continue the wrongs above set forth until all of the waters of the Walla Walla River are diverted and the citizens of the State of Washington deprived thereof during the irrigation season. The State of Washington offers to do complete equity in the premises and alleges that it has no adequate remedy at law and no remedy in any court except the Supreme Court of the United States. The State of Washington asks that this court exercise its sole jurisdiction over the determination of the respective rights of the States of Washington and Oregon and their citizens to the use of the waters of the Walla Walla River and its tributaries in said states, and that the State of Oregon be enjoined and restrained from diverting from the Walla Wallar River any of the waters of said streams to which the State of Washington and its citizens are found to be entitled.

**Answer.**

The answer filed by the State of Oregon admits the allegations of the bill as to the sources and the course of the Walla Walla River, but denies some of the allegations

of the Washington complaint as to the dividing of the river into branches in its course. The defendant admits that after the stream separates at Milton, Oregon, it flows in a wide valley and that several springs and small streams arise in the valley, which springs and streams naturally flow into and join the main branches of the river either before or after they pass into the State of Washington, but alleges that the amount of flow from such source during the summer and irrigation season of each year is limited. Defendant admits the necessity of irrigation to the successful growing of fruit, alfalfa and vegetables within the State of Oregon and admits that along certain parts of the river in Washington irrigation is necessary to the production of crops.

The answer then proceeds to set forth in detail the areas in Oregon along the river which require irrigation, the amount so required and the reasons for such water requirement; admits that the waters of the Walla Walla River come from springs, from melting of the snow and the rainfall in the Blue Mountains in which it rises, but alleges that after about the first of June of each year little of said flow comes from melting snow or rainfall directly; alleges that the springs contributing to said river gradually decrease in flow, so that ordinarily the flow of the stream in the latter part of July and during August of each year is greatly diminished in volume as compared with the flow during earlier months; that said stream varies from year to year and that in normal years the flow in the early spring is about 400 cubic feet per second, but the defendant denies that in the later part of the irrigation season the normal flow is 150 cubic feet per second or thereabouts or that during the past eight or ten years it has been any amount in excess of 80 cubic feet per second. Defendant admits that during the last eight or ten years the flow of the river

has been decreasing, but denies that it is only two-thirds of the normal flow. Defendant admits that the lands riparian to the Walla Walla River both in the States of Oregon and Washington were settled mostly prior to 1870, but denies that the cultivation of lands along the banks of the stream was limited largely to comparatively narrow strips of sub-irrigated land, or that the existence of such sub-irrigated lands was the cause of early settlement. Defendant alleges that during and prior to 1870 there had been diverted and appropriated from said stream system by means of ditches, dams and headgates for stock, domestic, irrigation and power purposes about 19 cubic feet per second of water, which water had been applied to the irrigation of about 700 acres of land and to power purposes, which waters so appropriated are still beneficially used within the State of Oregon. Defendant admits that since 1870 such uses have gradually increased. Defendant denies that about the year 1892 there were irrigated from said stream system in the State of Oregon only 1200 acres of land and alleges that on said date not less than 5831 acres of land were irrigated in Umatilla County, Oregon, from the waters of said stream and its tributaries. The defendant denies that 8500 acres of land were irrigated or were using water for the production of crops within the State of Washington at the end of the year 1892, or that there was any larger acreage irrigated from said stream or its tributaries than 6167.69 acres. The defendant alleges that of said 6167.69 acres irrigated in Washington during 1892, 3,024 acres lay along the Walla Walla River, the East and West branches of the Little Walla Walla, along Mud and Pine Creeks, and that said lands are principally sub-irrigated from the waters of said stream; the defendant further alleges that no part of said 7000 acres in the arid belt within the State of Washington was placed

under irrigation until the year 1898, when 80 acres were irrigated, and that thereafter the reduction of said lands to cultivation was slow, small in amount, and that in the year 1907 only about 1500 acres were irrigated; that in the year 1908 or 1909, because of shortage of water for the irrigation of said lands, a contract was entered into with the City of Walla Walla for the use of sewage water from the City of Walla Walla upon said lands, and that a pipe-line was constructed four and one-half miles in length with a carrying capacity of sixteen cubic feet per second for the utilization of said sewage water, and that thereby said sewage water was made available for the use of Washington irrigators in the year 1912. The defendant admits that the 7000 acres of land lying in the arid belt in the State of Washington along the Walla Walla River will not produce crops without irrigation, but denies that any of said lands required water in the year 1892 or that the same were irrigated at that time. Defendant denies that said 7000 acres, or any acreage in excess of 5,000 is in a high state of cultivation or devoted to the growing of crops or the furnishing of homes for any number of people in excess of 600, or that the same is worth a sum in excess of $20,000, or any other sum; admits that since 1892 there have been additional lands put under irrigation in the State of Oregon and that more of the full flow of said stream, during the summer months, has been taken therefrom and used upon said lands; defendant denies that said increase has been more particularly since 1920 or that said lands brought under irrigation have been further away from the banks of the stream or that the topography of the country is such that waste and seepage water does not return to the stream as was the case with earlier appropriations; denies that flood or excess waters of the stream in the early spring have

been appropriated for the irrigation of large areas of land in Oregon or that said appropriations so made are subsequent to Washington appropriations or that said appropriators of flood waters have increased from time to time their appropriations in disregard of the rights of Washington users or extended their use of flood waters beyond and after the recession of the flood waters to the detriment of Washington users, or that any such use has lowered the water table along the stream and destroyed the sub-irrigation of Washington lands; admits that diversions from the stream have been made under permits issued by the State Engineer of Oregon and alleges that since the year 1909 said permits have been granted under the general law of the State of Oregon; denies that the State of Oregon has in the past issued, or threatens in the future to issue permits for the wrongful use of the waters of Walla Walla River or that the State Engineer has fixed the duty of water at an excessive amount without consideration of the rights of Washington users or that any use in Oregon has deprived the Washington users of water to which they are entitled; denies that by reason of use in Oregon, Washington appropriators have been or are being deprived of sufficient water to irrigate their lands or are unable to successfully grow crops on their lands or that their crops and orchards are being destroyed or will be rendered wholly or at all unproductive.

The State of Oregon by way of defense, alleges that in the past the State of Washington and its users have from year to year increased their irrigated acreage without regard to the rights of prior appropriators and have unreasonably and excessively increased the amount of water taken from the stream and its tributaries, and are themselves thereby causing loss and injury to the irrigators in Washington if said irrigators are suffering because of an

insufficient water supply; that Walla Walla County, Washington, and that part thereof in which the Walla Walla River, Mill, Yellowhawk, Garrison, Titus, Cottonwood, Blue, Reser, Russell, Pine, Mud, Little Mud, Done and Stone Creeks lie, is in the same water shed as the Walla Walla River, the Tum-a-lum River and the tributaries of said Walla Walla River and said Tum-a-lum River on the Oregon side of the state line; that all of said streams in Walla Walla County are tributaries of the Walla Walla River; that Walla Walla is a municipal corporation having a population of fifteen to twenty thousand; that said city appropriates and uses for municipal purposes from Mill Creek, which stream arises in the State of Oregon and is the principal tributary of the Walla Walla River in the State of Washington, from 22 to 28 cubic second feet of water; that said water is completely consumed by said city for municipal purposes; that since the year 1919 and up to 1926, there has been appropriated and used in Walla Walla County, Washington, from the above named streams, water for the irrigation of 3490.76 acres of land and that during said period of time only 1573.98 acres of land within the State of Oregon have been placed under irrigation from the waters of the Walla Walla River and its Oregon tributaries; that the State of Washington, through its agencies, has permitted and allowed excessive use of waters upon Washington lands; that between 1919 and 1926, said state permitted and allowed the use of one cubic second foot of water from April 1st to July 1st for the irrigation of each 75 acres of land; one cubic second foot of water to each 100 acres of land from July 1st to October 1st of each year, and from October 1st to April 1st of each year one cubic foot of water per second to each 50 acres of land; that during the same period Washington irrigators have increased their use from said streams natur-

ally tributary to the Walla Walla River to a greater extent than Oregon irrigators have increased their use from the Oregon tributaries; that the State Engineer of the State of Oregon has established a duty of water of one-half inch to the acre for the irrigation season in said territory and has made all permits granted since 1909 for the use upon lands irrigated under Oregon permits subject to all prior existing rights; that in the year 1926 there were more acres irrigated in Walla Walla County, Washington, than in Umatilla County, Oregon, from the Walla Walla River and its tributaries; that in the State of Washington during said year there were 25,269 acres under irrigation; that 23,271 acres were farmed and irrigated while 2,018 acres were under existing ditches in various stages of development, and that the duty of water fixed by the State of Washington was applied to the lands so irrigated; that during the same year the State of Oregon had but 18,269 acres under irrigation from the Walla Walla River and its tributaries; that about 1904, there was commenced the development of the Attalia project in Walla Walla County, Washington, consisting of about 2400 acres; that in 1926 the flume carrying water to said Attalia lands was destroyed and part of the dam diverting said water was washed away; that neither said flume nor said dam has ever been replaced, and that since 1926, only about 100 acres of said land has been irrigated, and that the water appropriated for said use is now flowing unused into the Columbia River and that about 20 second feet of water flows in the Touchet River above said Attalia project and is not being put to a beneficial use. Defendant admits that the states of Washington and Oregon each recognize by their statutes and court decisions the existence of the doctrine of riparian rights prior to 1909, but denies that the owner of land riparian to a stream in Oregon

is entitled to his proportionate share of the waters flowing in such stream for the purpose of irrigation or subject to any such requirements as that such riparian use be perfected within a reasonable time or limiting such riparian right to such beneficial use or together with the doctrine of appropriation whereby the first appropriator in time is first in right, subject only to previously acquired riparian rights, or that the amount of the appropriation is to be dated as of the time when the work was instituted for the putting of the water to a beneficial use by the exercise of due diligence.

The state of Oregon, by way of further defense alleges that in the year 1909 a statute was passed by Oregon providing a system for the regulation, control and distribution and use of waters of the state and providing that, subject to existing rights, all waters within the state of Oregon may be appropriated for beneficial use and that any person intending to acquire the right to the use of any water shall, before commencing the construction of any ditch or other works, make application to the State Engineer for a permit to make such appropriation; application of water to a beneficial use prior to the passage of the act or under authority of a riparian proprietor shall create in such riparian proprietor a vested right to the extent of the water beneficially used; that since the passage of the act of 1909 the highest court of Oregon has decided that "a settler upon a non-navigable stream has an election, either to rely upon his right as a riparian proprietor or to make an appropriation of the water, if it is subject to appropriation, and claim as an appropriator" and "the right of appropriation is incompatible with the rule of riparian proprietorship. The doctrine of appropriation excludes the idea of equality and makes each water right superior to all others subsequently initiated

. . . while the characterizing feature of riparian ownership, when applied to irrigation, is equality or, perhaps to speak more exactly, the right of each person is correlated with the right of every other person, although a riparian owner may take all of the water in a stream if needed to satisfy domestic wants;" that ever since such decision was made, the rules there announced have been and are the law of Oregon; that said act further provides that where any riparian proprietor, at the date of the passage of the act, was engaged in good faith in construction of works for the application of water to beneficial use, the doctrine of relation may be applied. Defendant denies that the Oregon lands to which waters have been appropriated in recent years have been non-riparian lands or lands which have lost their riparian rights by failure to irrigate the same within a reasonable time. Defendant denies that a request has been made upon Oregon for the equitable division of the waters of the River or any division except a division dictated by the State of Washington, and denies that Oregon has failed to recognize the rights of the State of Washington and alleges that the State of Oregon permits all and more water than that to which the State of Washington is entitled to flow across the line between said two states without interference, but that the State of Washington is permitting said water to be wasted; denies that unless restrained by this honorable court, the State of Oregon will continue to use or divert the water of the Walla Walla River to which the citizens of the State of Washington are entitled.

Oregon alleges that more than twenty years before the commencement of this suit the courts of the State of Oregon adjudicated and determined the rights of the Oregon users, and that the rights so fixed have been continuously since used and are valuable property rights that have become

vested under the laws of Oregon and the United States; that in the year 1888, 2250 inches of the water of said stream, measured under a six-inch pressure, miner's measurement, were appropriated for power purposes, and in 1898, 500 additional inches so measured were appropriated for power purposes, and that other amounts of water were appropriated from said stream at various times both before and after said dates for power and irrigation uses, all of which waters were diverted from the channel of the Walla Walla River and from the Tum-a-lum River and used for power and irrigation purposes in a direction northwesterly from said point of diversion and that all of said waters were diverted into the Little Walla Walla River and thereafter flowed and still flow in a northwesterly direction away from the main stream. The defendant further alleges that in the early days the Tum-a-lum River carried the main flow of the waters of the Walla Walla River, but that for about forty years or more past said Tum-a-lum River has been absolutely dry during the summer and irrigation season of each year from a point about four miles above the state line to a point about two miles above said state line, but that water reappears in said stream about two miles above the state line in Oregon and flows therefrom into Washington, and that from the point of reappearance of said stream it is fed by many springs, seeps and marshes; that the State of Oregon and its people diverted, appropriated and used in good faith under claim of right and color of title and pursuant to the laws of the State of Oregon and the recognized custom of appropriating water from streams in said territory, and applied to a beneficial use, from about the year 1864 to 1893, water from said river and its tributaries for the irrigation of 5,831 acres of land and about 4,000 miner's inches measured under a six-inch pressure for

power purposes, and have since held and used said water for said purposes and from 1892 to 1909, appropriated and used water for the irrigation of 6712.73 acres, and from 1908 to 1921, appropriated and used water for the irrigation of 3,042.82 acres, and from 1927 to the present have appropriated and used water for the irrigation of 1,573.78 acres; said appropriators have taken, used, held and carried away said waters from said stream openly, notoriously and adversely to the State of Washington; that during the times mentioned above, the State of Oregon and its people have built dams, headgates, main and lateral ditches, leveled and cultivated lands, planted orchards, vineyards, pastures, lawns, meadows, alfalfa fields, ornamental and shade trees, and built and established homes upon said lands, constructed roads and highways, expended enormous sums of money, and during all of said time the State of Washington and its people had notice and knowledge of said developments and that neither the State of Washington nor its people have ever protested against the diversions, appropriations or use of waters of said stream as enumerated, and are thereby estopped from claiming or asserting any damages, or claiming any right or interest in or to the waters of said stream so appropriated, or from interfering with said appropriations and diversions; that both states recognize by their statutes and the decisions of their courts the same principles of law as to adverse possession, laches, estoppel and limitation of time within which real property may be recovered. Oregon prays that the said suit may be dismissed.

**Reply.**

Washington by its reply admits the allegations of Oregon's answer to the effect that during the summer, or irrigation season of the year, no water is discharged into

the Walla Walla River from the east or west branches of the Crocket or from the Ford Branch so far as the present time is concerned, and alleges that by means of dams and other controlling works, water has been in recent years diverted in the State of Oregon from the main stream into the Little Walla Walla River and into the various branches thereof and other drainage channels and into irrigation ditches in that locality, and the water has thus been prevented from returning to the main channel of the Walla Walla River in the State of Washington above the principal diversions of said Walla Walla River within the State of Washington. Washington denies the allegations on page 8 of Oregon's answer that 700 acres of land had been irrigated in the State of Oregon prior to 1870 and alleges that the amount so irrigated was approximately 70 acres. Washington denies that in 1892 there were under irrigation 5,831 acres of land in Umatilla County, Oregon, taking water from the Walla Walla River, and alleges that said acreage did not exceed 1200: Washington admits the construction of a pipeline for a distance of 4½ miles from the City of Walla Walla for the carriage of sewage water, but denies that any quantity of sewage water in excess of five cubic feet per second was ever carried in such pipeline. The reply admits that between 1919 and 1926 an undefined acreage has been placed under irrigation in the State of Washington, but alleges that the larger portion of such lands were not irrigated from the Walla Walla River or its Oregon tributaries or from waters which could be used in the State of Oregon, but that such lands were irrigated from the tributaries of the Walla Walla River and the Walla Walla River within the State of Washington. It is further alleged that in the year 1926 only approximately 6,000 acres of Washington land received water from the Walla Walla River and

its tributaries, during the summer irrigation season; that the balance of the lands irrigated in the State of Washington as set forth in the Oregon answer, (pages 17 and 18) having rights of late priority, receive water only intermittently during the winter and spring run-off. Replying to the allegations of defendant on page 18 of its answer as to the number of acres of land irrigated in Walla Walla County, Washington, from the Walla Walla River and its tributaries, complainant alleges that of the lands so alleged by defendant to be irrigated in said County, not to exceed 11,000 acres are irrigated from the Walla Walla River or its tributaries, or from waters which are or can be used for irrigation in the State of Oregon, and of those so irrigated a considerable portion are irrigated only during the non-irrigating season, when the waters would otherwise be wasted. It is alleged that all of the water in the Walla Walla River at or below the mouth of the Touchet River is return and seepage water which had been put to a beneficial use, and that no part of said water can be used for irrigation of lands in the State of Oregon or the State of Washington. Complainant admits that the amounts of water diverted from the Walla Walla River and from the Tum-a-lum River for power and irrigation purposes have been discharged into the Little Walla Walla River as alleged on page 24 of defendant's answer, but the complainant denies that said waters so diverted flowed and still continued to flow away from the main stream in a northwesterly direction from a point just below the forks of the Tum-a-lum and Little Walla Walla Rivers, and alleges that such waters have reached and unless wrongfully diverted will reach the main stream of the Walla Walla River above the principal Washington diversions. It is further admitted in the reply that during the last ten years at short intervals the citizens of Oregon have diverted all

of the waters of the Walla Walla River above the Tum-a-lum section, the period of diversion varying according to the season, but alleges that during the past forty years or more, at no time has the whole supply of said section of the Walla Walla River been diverted during the entire summer and irrigation season.

The reply makes appropriate denial of all of the affirmative defensive matters set forth in the answer of the State of Oregon except as qualified above.

## STIPULATIONS.

The parties hereto, after the filing of the complaint, the answer and the reply, entered into a series of stipulations, eleven in number, which stipulations embody agreements of the parties as to facts material to the issues involved. These stipulations have very materially limited the record in this case and have obviated the taking of testimony upon all issues as to which the parties were able, after diligent effort, to come to an accord.

A summary of these stipulations is as follows:

STIPULATION NO. 1

The decrees of the courts of the states of Washington and Oregon and the abstract of water permits of the State Engineer of the State of Oregon and the abstract of water permits issued by the State Supervisor of Hydraulics of the State of Washington are admissible in evidence as fixing the relative individual rights of the parties named therein and their successors in interest to the use of water, in the amounts, for the purposes and at the places or on the lands set forth in said respective permits and in said respective decrees; with the provision that the admission

of these decrees and permits shall not be construed as or held to be an admission, waiver, abridgment or modification of the rights of either state as against the other relative to the right claimed by the city of Walla Walla, Attalia Irrigation District, Touchet River, Mud and Pine Creeks, and that said stipulation shall not be a waiver of the claims of the State of Oregon upon the ground of adverse use and estoppel, and the distribution of water in Oregon as a separate stream system.

STIPULATION NO. 2.

Paragraph 1 of this stipulation is an agreed statement as to the stream system in the two states and is as follows:

> "The Walla Walla River rises in the western slopes of the Blue Mountains in Northeastern Oregon. Two branches, called the North Fork and the South Fork, unite about four miles above the city of Milton. From this point the river flows through a narrow irrigated valley, approximately one-half mile wide, until it reaches Milton, where the river divides in a delta formation. The pipe line of the city of Milton diverts water from the South Fork at a point in the Southeast quarter of the Southeast quarter of Section 22, Twp. 5 North, Range 36 E. W. M., and furnishes water for its power plant, which is located in the Northwest quarter of the Southwest quarter of Section 18, Twp. 5 North, Range 36 E. W. M. Couse Creek, flowing from the west, enters the main stream a short distance above the city of Milton and just below the city's hydroelectric power plant.
>
> "The delta formation comprises lands in Sections 12, 1, 2 and 3, Twp. 5 North, Range 35 E. W. M., and in Sections 34, 35, 36, 25, 26 and 27, Twp. 6 North, Range 35 E. W. M.
>
> "The first division of the stream in this delta formation is immediately below the bridge crossing the river in the Southwest quarter of the Northeast

quarter of Section 12, Twp. 5 North, Range 35 E. W. M. At this point the stream divides into the Little Walla Walla and the Tumalum (as called in Oregon) or Main Walla Walla (as called in Washington).

"The Little Walla Walla in turn, after flowing a distance of about a mile, at a point in the Northeast quarter of Section 2, Twp. 5 North, Range 35 E. W. M. (called locally 'the Frog'), divides into the Ford Branch and the Crocket Branch. It is at this point that the water is measured into the ditch of the Milton, Freewater & Hudson Bay Irrigation Company.

"The Crocket Branch, immediately below, divides into the East and West branches of the Crocket, and the West branch of the Crocket divides into three prongs. The two easterly of these prongs join, about a mile and a half below, the East branch of the Crocket and discharge into the East Prong of the Little Walla Walla Spring Branch, which in turn empties into the East Little Walla Walla River across the line in the State of Washington. The East Little Walla Walla River discharges into the main stream near the Northeast corner of Section 10, Twp. 6 North, Range 35 E. W. M., in the State of Washington.

"The several prongs of the West branch of the Crocket, which unite in the Northeast quarter of Section 26, Twp. 6 North, Range 35 E. W. M., with the East branch of the Crocket to form the East Prong of the Little Walla Walla River Spring Branch, contribute little, if any, water to this Spring Branch during the irrigation season.

"Beginning in Sections 23 and 24, Twp. 6 North, Range 35 E. W. M., there are numerous springs which supply the water during the irrigation season to this East prong Spring branch, Ballou Spring Creek, Big Spring Branch and Grandview Creek, which form the East Little Walla Walla River in Washington.

"Lewis Spring Branch rises to the west of these springs in the Southeast quarter of the Southwest

quarter of Section 23, Twp. 6 North, Range 35 E. W. M., in the State of Oregon. Its waters are all diverted for irrigation during the irrigation season. The natural drainage of the lands watered from the Lewis Spring Branch is toward the Northwest. These waters come to the surface in a spring arising just across the line in the State of Washington. This spring forms the beginning of Walsh Creek in that state.

"The Westerly prong of the West branch of the Crocket unites with the Ford branch at a point in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla, which crosses the line into the State of Washington, where it is known as the West Little Walla Walla River. The West Little Walla Walla River empties into the main stream in Section 31, Twp. 7 North, Range 35 E. W. M., in the State of Washington, below the intake of the canal of the Gardena Project.

"The Westerly prong of the West branch of the Crocket unites with the Ford branch in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla. These two branches, however, furnish little, if any, water to the West prong during the irrigation season. Springs in and near the channel of the West prong constitute substantially its only supply of water during the irrigation season.

"West of the center line of Sections 22 and 27, Township 6 North, Range 35 E. W. M., rises the East branch of Mud Creek and the Middle branch of Mud Creek, which unite to form Mud Creek in Washington, which flows into the Walla Walla River in Section 36, Twp. 7 North, Range 33 E. W. M.

"Further west is South Mud Creek, Schwartz Spring Branch and Dry Creek, which are tributaries of Pine Creek. South Mud Creek crosses the State Line North of Section 15, Twp. 6 North, Range 34 E. W. M., and flows westerly in the State of Washington about a quarter of a mile from the State Line to Pine Creek. It is known as Little Mud Creek in

the State of Washington. Pine Creek enters the main stream in Section 2, Twp. 6 North, Range 33 E. W. M., below all the diversions on the main stream involved in these proceedings. Johnson Creek, Goodman Spring branch and Dugger Creek are spring branches in Oregon in the water shed of Pine Creek, but have no surface channel connection therewith.

"Birch Creek rises in the State of Oregon and flows Northwesterly and westerly not far from the State Line, until a short distance from the main stream, where it turns northerly, crosses the line, and enters the main stream in Section 13, Twp. 6 North, Range 35 E. W. M., in the State of Washington just North of the State Line.

"Shortly after passing the line into the State of Washington, the main stream turns and flows through wide valleys in a westerly direction a distance of approximately thirty miles, where it empties into the Columbia River, near Wallula.

"The principal tributary of the main stream in the State of Washington is Mill Creek, which also rises in the Blue Mountains in the State of Oregon. None of the waters of the water shed of this tributary reaches the main stream in the State of Oregon. Approximately twelve miles above the confluence of Mill Creek with the Walla Walla River, the tributary divides, one branch forming Yellowhawk Creek. Yellowhawk Creek, in turn, divides, one branch forming Garrison Creek. The courses of Yellowhawk Creek and Garrison Creek diverge for a ways, then run nearly parallel in a southwesterly direction to the main stream, Garrison Creek entering the main stream in the Northeast quarter of the Southeast quarter of Section 4, Twp. 6 North, Range 35 E. W. M., and Yellowhawk Creek entering the same in the Northeast quarter of the Northwest quarter of Section 11, Twp. 6 North, Range 35 E. W. M. The intake of the Gardena Project is located on the main stream between the two points.

"Garrison Creek has no tributaries, except a few inconsequential spring branches.

"Cottonwood Creek, Russel Creek and Lasater Spring Branch are tributaries of Yellowhawk; the lower of these tributaries entering the same about one mile and a half above its mouth. Reser Creek in turn is a tributary of Russell Creek. About a mile and a half above the Yellowhawk division, Mill Creek divides, one branch being Titus Creek, which parallels and then unites with Mil' Creek about a mile below the Yellowhawk division. Mill Creek runs through the City of Walla Walla and enters the main stream near the Whitman Mission, in Section 31, Twp. 7 North, Range 35 E. W. M.

"At the point of the Yellowhawk division of Mill Creek, controlling works have been constructed and the waters of Mill Creek are apportioned between the two streams in accordance with the priorities of the rights of persons entitled to water from the two streams, except rights in lower Mill Creek, below the Southeast quarter of the South east quarter of Section 23, Twp. 7 North, Range 35 E. W. M., which for practical purposes are administered independent of the rights on the upper portion of the stream above that point.

"Stone Creek is a tributary of the main stream, entering the same below Yellowhawk in the Southwest quarter of Section 3, Twp. 6 North, Range 35 E. W. M., and below the intake of the canal of the Gardena Project. Doan Creek is a tributary of lower Mill Creek and enters the same in the Northwest quarter of the Northwest quarter of Section 32, Twp. 7 North, Range 35 E. W. M. The Touchet River is a tributary of the main stream, entering the same in Section 4, Twp. 6 North, Range 33 E. W. M. McEvoy Spring Branch enters the main stream in the Southwest quarter of Section 3, Twp. 6 North, Range 35 E. W. M., above the intake of the canal of the Gardena Project. There are other spring branches entering the stream which are two inconsequential to mention specifically. Yellowhawk Creek, East Little Walla Walla River, McEvoy Spring Branch and Birch Creek are the only tributaries entering the

main stream in the State of Washington above the intake of the canal of the Gardena Project."

Paragraph 2 is a limitation of the issues as to the City of Walla Walla, Attalia Irrigation District, Touchet River, Mud and Pine Creeks, and effectually eliminates these specified rights and tributaries from further consideration by the court.

STIPULATION NO. 3.

Stipulation No. 3 is an agreed statement as to (1) land forms, drainage and climate; (2) irrigation practices; (3) crop production; (4) community development; (5) population, farm acreage and assessed values, priorities and approximate acreage. It is not deemed advisable to in any way abbreviate or abstract this stipulation. It is therefore set forth in full:

"1.

LAND FORMS, DRAINAGE AND CLIMATE
(Based largely on the report of A. M. Piper)

"The Walla Walla Basin is part of a plateau extending from the Columbia River to the Blue Mountains. The western edge of the adjacent Blue Mountain section is about 10 miles East of the city of Walla Walla. This plateau has moderate relief, ranging from 1900 feet elevation along the flank of the Blue Mountains to 400 feet in the river bottoms at the Western edge of the area. The only extensive flat areas are the flood plains and terraces developed by the larger streams. For the most part, the upland areas comprise sub-parallel ridges tending North 20 degrees East, separated by V-shaped valleys which commonly are 50 to 300 feet deep. These ridges and slopes have a deep fertile soil. The Walla Walla

Valley is rudely triangular, and from apices in the canyons of Mill Creek and the Walla Walla River, converges westward to the head of the gorge which begins 20 miles to the West. Near Whitman, where the Walla Walla River and Mill Creek join, the valley is ten miles wide. At Touchet it is about four miles in width. The valley comprises three distinct physiographic divisions. In order of decreasing age, these are: the Gardena terrace, whose remants in places are as much as 120 feet above the flood plains of the river; the Low terrace, whose remnants parrallel the flood plains and are commonly less than 20 feet above them; and finally the alluvial fans of the Walla Walla River and of Mill Creek and the flood plains of the river and its tributaries.

"The Gardena terrace is now thoroughly dissected, and is represented by numerous remants, which range in size from flats 18 miles in length to hillocks 100 yards across. The most prominent remant lies south of the Walla Walla River, in the Western part of the area upon which is situated the Gardena irrigated district, from which this land form is named. This remnant in places stands 120 feet above the flood plain of the river, southeast of Touchet, and 40 feet above the flood plain of Dry Creek in Oregon, 10 miles to the East. The remnant flanks the Southern wall of the valley for a distance of 12 miles. The larger remnant of the Gardena terrace lies North of Walla Walla. In the central plain of the basin the terrace has been thoroughly dissected by the several distributaries of the Walla Walla River and Mill Creek, which have left long narrow remnants. In general the gradient of the Gardena terrace is slightly less than that of the adjacent flood plain. Remnants in the flood plain of the area are 100 to 120 feet above the flood plain, and slope westward less than 20 feet to the mile. Those in the Eastern part of the area stand only 10 to 25 feet above the fans of the Walla Walla and Mill Creek and decline westerly 60 to 75 feet in a mile.

"The Low terrace is inconspicuous and is represented by remants less than one mile wide and as much as 8 miles long, and which border the flood plains. Remnants of the Low terrace are readily discernible in the Western part of the area, where they are 5 to 20 feet above the flood plain. Upstream they become lower and less discernible and commonly merge into the flood plain without any topographical break.

"The alluvial fan of the Walla Walla River slopes North from an apex at the mouth of the rock-walled canyon at Milton, and is about 4 miles long and 4 miles wide along the outer margin. At its apex the fan is about 1070 feet above sea level. From this altitude it descends about 50 feet to the mile and stands about 850 feet above sea level at its outer margin. This feature is delimited to the North and West by the upstream ends of the several remnants of the Gardena and Low Terraces. The Walla Walla River, commonly called the Tumalum, follows its East margin. Below the fan the Walla Walla River and its several distributaries have developed flood plains which generally are less than 0.5 miles wide and which are separated or bordered by long narrow remnants of the Low terrace or by higher remnants of the Gardena terrace. The alluvial fan of Mill Creek is less prominent than the fan of the Walla Walla at Milton. This fan originates at an apex about 2 miles east of Walla Walla and is roughly relimited by Yellowhawk Creek on the South, by the main channel of Mill Creek on the North, and by several narrow remnants of the Gardena terrace on the West. The maximum width of one and a half miles is attained at Walla Walla. Both above and below the fan, the flood plain of Mill Creek averages 0.5 miles wide. The gradient of the Walla Walla River decreases progressively downstream. At the junction of the canyons of the North and South forks it is about 80 feet in a mile. Across the fan North of Milton the average slope is about 60 feet in a mile. At Whitman, in the central part of the valley, the

slope is 40 feet to the mile, and further downstream, between Touchet and the head of the gorge, it becomes less than 10 feet to the mile. The Walla Walla River drains about 150 square miles above Milton, its drainage area being moderately rugged and moderately high in altitude. Little rain falls on the drainage area in the summer, and a large part of the precipitation in the winter is snow. Under these conditions, the stream is subject to an annual spring freshet and is flashy throughout the year.

"The gradient of Mill Creek is about 100 feet to the mile at the mouth of the canyon, 65 feet to the mile at Walla Walla, and 50 feet to the mile near Whitman, which is just above its junction with the Walla Walla River.

"The Walla Walla Basin has a semi-arid climate, with warm dry summers and cold wet winters. The mean temperature in the warmest month, which is generally July, is 73.9 deg. F. at Milton, 76.5 deg. F. at Walla Walla, and 72.8 deg. F. at Lowden. In the coldest month, which generally is January, it is 31 deg. F. at Milton, 30.9 deg. F. at Walla Walla, and 29.1 deg. F. at Lowden. The mean annual temperature is 52.6 deg. F. at Milton, 53.9 deg. F. at Walla Walla, and 51.3 deg. F. at Lowden. During the past ten years, the highest recorded temperature was 107 deg. F. and the lowest was —15 deg. F. During the same period, the latest killing frost in the spring has ranged from March 9th to May 9th and the earliest killing frost in the autumn from September 21st to November 12th. The average growing season or frost-free period, is 193 days. The average annual rainfall at Milton, during the 11 year period 1922-1932, was 12.99 inches, of which 1.54 inches fell during the three summer months, July, August and September. The average annual fainfall at Walla Walla during that period was 14.37 inches, of which 1.64 inches fell during the three summer months. The average annual rainfall at Lowden, during the same period, was 9.52 inches, of which 1.25 inches fell during the three summer months.

## II.

## IRRIGATION PRACTICES.

"The growing season in the Walla Walla Basin extends from April to October, inclusive. Irrigation during this growing season is called herein summer irrigation, and irrigation during any other part of the year is herein called winter irrigation. Winter irrigation is practiced on the lands served by the Milton, Freewater & Hudson Bay Irrigation Company, and on some of the lands of the Gardena project. The balance of the Walla Walla Basin is served by summer irrigation. In all cases where the water supply is not sufficient to supply water during the entire growing season, the practice is to store water in the soil, where possible, by irrigation prior to the growing season and whenever water is available. In the summer irrigation of orchards, alfalfa and grain, outside of the gravelly soil, the practice is to apply water about once every two weeks. In areas of gravelly land, the practice is to apply water to such crops once a week. In the gravelly soil in and around Milton and Freewater, for strawberries, tomatoes, garden vegetables and short-rooted crops, the practice is to apply water two to three times a week. Where the application is made several times a week, the period of application is from two to four hours each time. Where it is once a week, the time of application is from eight to twelve hours. Where application is made at longer intervals, the length of time depends upon the amount of acreage, and in most cases a continuous flow to each irrigator is used. The flooding method of irrigation is not practiced. Nearly all the irrigation is by what is known as the corrugation method.

"It is the general practice in the orchards to grow cover crops of clover, alfalfa and the like, as a protection against evaporation. These crops are usually chopped into the soil as fertilizer.

"Controlling works are found at the principal points of diversion from the stream. Weirs for meas-

uring individual rights are in general use throughout the valley.

"Rotation is practiced to a considerable extent. In Oregon, in the deep soils, the rotation period is from one to two weeks for alfalfa and grain. In the gravel soils, for orchards and alfalfa, the average irrigated acreage for a group of rotaters is about 60 acres, and rotation is practiced on a weekly basis. Where the gravel soil about Milton and Freewater is cultivated to strawberries, tomatoes, vegetables and short rooted crops, the average irrigated acreage for a group of rotaters for such crops is from 10 to 20 acres and rotation is practiced on both a twice a week and a thrice a week basis. Rotation under the Oregon decree may be enforced by the water master, and in some instances is carried out by agreement of the parties. In Washington, rotation is practiced under all ditches operated by irrigation districts, and in the vicinity of Walla Walla, by private arrangement between the individual water users. The period of rotation varies greatly, but averages, it is estimated, about ten days.

"In some instances there is a run-off from the irrigated lands, caused by the use of a large head of water. This run-off, locally called waste water, is utilized on succeeding tracts.

"In the section around Milton and Freewater, there are approximately 300 wells which pump water from the lower gravel strata and apply it to irrigation. In Washington there is little irrigation from wells.

## III.

## CROP PRODUCTION.

"*Oregon.* In Oregon the crops consist of wheat, alfalfa, hay, prunes, apples, cherries, tomatoes, berries, vegetables and nursery stock. In the irrigated section there are from 3000 to 4000 acres of prunes, yielding about 6 tons to the acre; from 1000 to 1800

acres of apples, yielding about 8 tons to the acre; 200 to 300 acres of cherries, yielding about 4 tons to the acre; about 200 acres of tomatoes, yielding 10 tons to the acre. (The acreage of tomatoes has been cut down this year from past years, in accordance with the general policy of cutting the amount of production. Last year the acreage was about 300 acres.) There are about 125 acres of berries, yielding about a ton to the acre. Nursery stock of about 175 acres supplies about 40 carloads per year, besides the local market. Alfalfa hay is raised on from 2000 to 2500 acres of land, and yields from 5 to 7 tons per acre, depending on the length of time that water is available for irrigation. In this district there are approximately 2500 dairy cattle, exclusive of those kept for family purposes only. In the line of vegetables, squash, melons, potatoes and other varieties yield in proportion to the tomatoes. There has also developed a considerable flower trade. A number of growers specialize in peonies, supplying the trade not only with peony blooms but with the plants.

"*Washington.* The crops of the valley in Washington consist principally of alfalfa, wheat, vegetables and fruits. It is estimated that 40,000 tons of alfalfa are raised in this area annually. The average acreage yield is 6 tons. Wheat on irrigated land is generally raised as part of the rotation between alfalfa plantings. It is estimated that 1000 acres of wheat are irrigated in this area annually. The average acreage yield is 50 bushels. Crops of vegetables are grown quite extensively. The average annual yield of the following varieties is: Head lettuce, 49 cars; cabbage, 16 cars; rhubarb, 35 cars; onions, 300 cars; spinach, 100 cars; tomatoes, 30 cars; cantaloupes, 46 cars; potatoes, 307 cars; mixed vegetables, 84 cars. The average acre yield of the following varieties is: Asparagus, 500 boxes to the acre; spinach, 500 boxes per acre; onions, 600 sacks per acre; potatoes, 200 sacks per acre. Fruits are also grown in this area. In 1932, 125 cars of apples and 302 cars of prunes

were estimated to have been shipped out of Walla Walla. Apples in this territory yield from 5 to 10 boxes per tree. Prunes yield as high as 600 boxes to the acre. The sweet varieties of cherries are grown, yielding as high as 100 pounds to the tree. It is estimate that 145 tons of cherries were raised in 1929. Peaches and pears are grown successfully, principally for the local market. 16 tons of peaches were raised in 1929. An average of 10 cars of grapes are shipped from Walla Walla annually. Strawberries yield as high as 600 crates to the acre. Approximately 100 acres in this area are devoted to berry culture. It is estimated that there are 4000 milk cows on the farms in this area. Two and three-quarters million gallons of milk were produced in 1929. Poultry is also raised extensively. 7500 turkeys, 1600 ducks and 1000 geese were estimated to have been raised in this area in 1929. $47,000.00 was also realized from the sale of chickens in that year.

## IV.

## DEVELOPMENT OF COMMUNITY.

"*Oregon.* The Oregon community supports a flour mill, a sawmill and box factory, cider works, a dehydrating plant and a vinegar plant, in addition to a number of commission houses and fruit and vegetable distributors. In order to handle the fruit and vegetable crops, five cold storage houses have been erected and are operated by the various companies.

"The district contains ten grade schools, having a total of about 1000 pupils, and a splendid Union High school. There are about ten churches. This property, together with the municipal buildings of the two towns, represents a value of about half a million dollars.

"*Washington.* In the city of Walla Walla there are 66 manufacturing plants, including four flour and feed mills, a meat packing house, a cannery, special-

izing in vegetable canning, three creameries, an iron products foundry, two sash and door factories, a concrete pipe and conduit plant, and other small manufacturing enterprises. The annual value of the products of these industries is $6,279,166.00.

"The city of Walla Walla supports a high school, six grade schools, three parochial schools, three music schools and two colleges, with an aggregate average annual attendance of 5300 students. There are twenty-four churches, representing all principal denominations, four theatres and three hospitals. Grade schools and churches exist and are well distributed outside the city in this area.

## V.

## POPULATION, FARM ACREAGE AND ASSESSED VALUATION.

"The territory herein considered excludes all that part of the river basin which by stipulation has been heretofore removed from any issue in the case.

"*Oregon.* The related territory in Oregon, excluding the Hudson Bay lands, has a population, according to the 1930, census, of 4772, of which 2308 is urban, being the cities of Milton and Freewater, and 2464 is rural. In addition, the Hudson Bay lands are occupied by about 65 families, which would raise the total population of the district to about 5000.

"The irrigated lands are farmed intensively. The 6233.87 acres irrigated from the Walla Walla River, spring branches and East Prong of the Walla Walla, are divided in 889 farms, with an average acreage of 7.01 acres. The West Prong and Lewis Spring Branch have 618.74 acres, divided into 36 farms with an average acreage of 17.19. The Pleasantview Ditch Company irrigates 1249.18 acres, divided into 62 farms with an average acreage of 20.15. The Milton, Freewater & Hudson Bay Irrigation Company irrigates 2675.41 acres, divided into 57 farms, with an

average acreage of 47 acres. This makes a total acreage in the related area of 10,777.20, divided into 1044 farms, or an average acreage of 10.32 acres.

"This acreage has an assessed valuation, on the 1932 roll, exclusive of the Hudson Bay acreage, of $1,543,120.00. The Beauchamp land, of 86.67 acres, irrigated under the Hudson Bay, is assessed at $11,810.00, and the Markham land, 200 acres, is assessed at $21,560.00. Based upon these assessments, it is estimated that the assessed value of the Hudson Bay lands is substantially $250,000.00. The assessed valuation of the cities of Milton and Freewater is $915,975.00. This makes a total assessed valuation of the related district of $2,709,095.00. The assessed valuation is usually counted as averaging about fifty per cent of the actual value.

"*Washington.* The related territory in Washington, outside the incorporated towns, has a population of 7090, according to the 1930 U. S. census. The population of the city of Walla Walla, according to the same authority, is 15,976. There are 9615 acres of irrigated land in the vicinity of Walla Walla. The size of the farming units in this area varies from 1 to 500 acres. The average is 17 acres. In the vicinity of Lowden there are 3231 acres, ranging in size of unit from 2 to 160 acres with an average of 38 acres. In the Gardena district, the smallest unit is 4 acres, the largest 200 acres, and the average 70 acres.

"The above described acreage in the vicinity of Walla Walla has an aggregate assessed valuation, on the 1932 tax roll, of general taxes, of $3,845,942.00. The assessed valuation of lands in the city of Walla Walla for the same year is $8,137,409.00. In the vicinity of Lowden, lands were assessed for the same year at $225,670.00, and in the Gardena District, at $234,663.00. The total aggregate assessed valuation of the land in the related area is $12,443,684.00. Under the law in the State of Washington, lands are assessed for taxation purposes at fifty per cent of their actual value.

## "PRIORITIES AND APPROXIMATE ACREAGES, AS SHOWN BY DECREES AND PERMITS.

"The following tabulation shows the approximate acreage under each year's date of priority, as shown by the several decrees of the two states, for the related area, excluding all that part of the river basin which by stipulation has been heretofore removed from any issue in the case, and including the Gardena appropriation, the priority of which is contested by Oregon.

| | OREGON | | | WASHINGTON | | |
|---|---|---|---|---|---|---|
| Year | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1859 | | | | | 37.15 | |
| 1861 | | | | | 314.00 | |
| 1862 | 35.84 | | | | | |
| 1863 | | | | | 83.50 | |
| 1864 | 38.22 | | | | 81.61 | |
| 1865 | 37.12 | | | | 124.23 | |
| 1866 | 3.30 | | | | 137.13 | |
| 1867 | 8.24 | | | | | |
| 1868 | 60.28 | | | | 89.90 | |
| 1869 | 4.18 | | | | 44.45 | |
| 1870 | 47.31 | | | 160.00 | 8.583 | |
| 1871 | 11.06 | | | | | 35.00 |
| 1872 | 55.78 | | | | 79.75 | |
| 1873 | 65.50 | | | | 13.00 | |
| 1874 | 25.26 | | | | | |
| 1875 | 291.47 | | | | 20.40 | |
| 1876 | 72.90 | 15.00 | | | 1.32 | |
| 1877 | 87.73 | | | | 12.00 | |
| 1878 | 81.74 | | | | 54.77 | |
| 1879 | 31.55 | | | | | |
| 1880 | 180.17 | | 43.80 | | 25.20 | |
| 1881 | 123.46 | | 7.50 | | 51.50 | |
| 1882 | 86.90 | | | | 91.00 | |
| 1883 | 55.09 | | 13.00 | | 61.73 | |
| 1884 | 16.50 | | | 125.00 | 149.48 | |
| 1885 | 135.35 | | 14.00 | | 94.88 | |

| | OREGON | | | WASHINGTON | | |
|---|---|---|---|---|---|---|
| Year | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1886 | 54.51 | | 32.00 | | 141.35 | 20.00 |
| 1887 | 217.76 | | | | 30.50 | |
| 1888 | 93.38 | | | | | |
| 1889 | 65.86 | | | | 98.91 | 462.90 |
| 1890 | 113.72 | 10.00 | 60.29 | | 48.50 | |
| 1891 | 131.49 | | | | 178.67 | 29.00 |
| 1892 | 264.05 | 10.00 | 15.00 | 8221.11 | 647.63 | |
| 1893 | 157.54 | | 9.75 | 431.96 | 18.00 | |
| 1894 | 102.12 | | 82.00 | | 477.97 | 187.70 |
| 1895 | 242.07 | | 75.50 | | 246.75 | |
| 1896 | 30.72 | | | 180.79 | | 65.00 |
| 1897 | 128.31 | | 10.50 | | 141.25 | |
| 1898 | 44.37 | | 9.50 | | 160.00 | |
| 1899 | 7.06 | | | | 6.50 | |
| 1900 | 198.99 | | 50.00 | | 99.33 | |
| 1901 | 87.69 | 49.90 | 11.00 | | 105.45 | 1.00 |
| 1902 | 165.90 | 33.90 | 72.00 | | 38.00 | 52.00 |
| 1903 | 2725.04 | 15.30 | 7.50 | 40.00 | 147.06 | |
| 1904 | 23.02 | 8.70 | 14.50 | 330.00 | 884.58 | |
| 1905 | 136.35 | 12.80 | | | 25.05 | 10.00 |
| 1906 | 40.06 | | 16.00 | | 123.75 | |
| 1907 | 80.99 | 8.75 | 7.00 | 50.00 | 153.15 | |
| 1908 | 193.82 | 38.84 | 16.70 | | 202.55 | 106.00 |
| 1909 | 316.71 | | | | 42.00 | |
| 1910 | 33.25 | | | | 32.28 | |
| 1911 | | | | | 50.00 | |
| 1912 | 962.14 | | | 15.00 | 371.00 | |
| 1913 | 392.25 | | | | 33.19 | |
| 1914 | 14.00 | | | | 136.50 | |
| 1915 | 97.00 | | | | 63.10 | |
| 1916 | 28.80 | | | | 9.40 | 33.00 |
| 1917 | 59.00 | | | | 63.28 | 21.00 |
| 1918 | 28.00 | 8.00 | | | 49.90 | |
| 1919 | 59.00 | | 9.25 | 5.00 | 29.00 | 35.00 |
| 1920 | 27.50 | 15.00 | 32.00 | 50.00 | 61.74 | 32.00 |
| 1921 | 12.00 | | | | 75.52 | |
| 1922 | 140.00 | 113.00 | | | 3.60 | |

| | OREGON | | WASHINGTON | | | |
|---|---|---|---|---|---|---|
| Year | Walla Walla River | Waste | West Pg. in Oregon | Walla Walla River | Tributaries | West Pg. (Little W. W. R.) |
| 1923 | 140.00 | 37.00 | | | 11.00 | |
| 1924 | 91.00 | 5.00 | | 35.00 | 6.00 | |
| 1925 | 41.00 | 25.00 | | | 0.50 | |
| 1926 | 3.50 | | 10.00 | 880.00 | 1419.80 | 49.00 |
| 1927 | 90.40 | | | 15.00 | | |
| 1928 | 281.15 | | | | 25.00 | |
| 1929 | 30.00 | | | | 7.50 | |
| 1930 | 44.80 | | | | | |
| 1931 | 1.00 | | | | | |

STIPULATION NO. 4

This stipulation qualifies for admission as evidence (1) Youngs' soil map, (Washington Exhibit 15); (2) report of A. M. Piper and others on ground water, (Washington Exhibit 16); (3) Map of lands involved in the adjudication of rights in the Walla Walla River showing Walla Walla River tributaries and diversions, (Washington Exhibit 17); (4) state constitutions and statutes in argument or by reference.

STIPULATION NO. 5

This stipulation embodies such facts relative to the history and rights of the Gardena Farms District as the parties were able to agree upon. It sets forth that the diversion by the Gardena Farms District, formerly the Walla Walla Irrigation Company, is the largest diversion from the Walla Walla River in the State of Washington and fixes the point of this diversion and the course of the canal. By decree of the Superior Court of the State of Washington for Walla Walla County, the Walla Walla Irrigation Company was given a priority of 1892 with the right

to irrigate 7,000 acres of land with a maximum amount of 93.333 c.f.s. of water from April 1st to July 1st, and 70 c.f.s. of water from July 1st to October 1st, subject to the following limitation:

> "That claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the referee, to wit, on the 29th day of March, 1926, is entitled to use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st, 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said lands may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics."

The certificate of water right following upon the decree is attached to the stipulation and marked Exhibit "A." In 1928 the Gardena Farms District succeeded to the rights of the Walla Walla Irrigation Company. In the beginning J. F. Boyer, J. T. Kirk and W. F. Courtnay caused preliminary surveys to be made and a canal route to be located. Several notices of appropriation were posted at the proposed point of diversion and recorded in the proper office for the recordation of such notices. No diversion was ever made from the Little Walla Walla River.

The stipulation then proceeds:

"In the spring of 1892, E. C. Burlingame, a contractor, became interested in the project and made further surveys and investigations of the route of the canal, and thereafter acquired an interest therein.

"Soon thereafter in the same year a corporation was formed, known as the Walla Walla Irrigation Company. On November 5, 1892, formal conveyances of the rights of the individual appropriators were made to the Company, by deed recorded January 24, 1893, in Book 53, at page 179, Deed Records of Walla Walla County, Washington.

"Mr. Burlingame performed the construction work for the Company using his own equipment and teams up to the time of the formation of the irrigation district which succeeded to the rights of the Company in 1928.

"In August, 1892, actual construction work on the canal was begun.

"Prior to the year 1905 the canal was constructed from the diversion point in the McBean donation land claim in the SW¼ SW¼ Section 3, Twp. 6 North Range 35 E. W. M. along the route of the canal as shown on the official map herein, to a point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. where the map indicates that the canal divides. From said divisional point one division of the canal was constructed in a Southwesterly direction into the State of Oregon, and also from said divisional point, prior to the year 1905, one division was constructed in Northwesterly direction along the route indicated on the map to a point in Section 5, Twp. 6 North Range 34 E. W. M. About a mile from the upper end of the syphon.

"In the winter and spring of the year 1905 an inverted syphon was constructed from a point in the SW¼ of the NW¼ of said Section 5, to a point in the NE¼ SE¼ of Section 12, Twp. 6 North Range 33 E. W. M. from which point the distribution system for the irrigation of the lands West and South of

the syphon was constructed and has been extended as the demands of irrigation required. This syphon has a head of 145 feet, carries the water of the canal across the valley of Pine Creek a mile and a half in width, and is built of wood staves and steel bands. It was originally of a diameter of 38 inches and has since been replaced by Gardena Farms District by one 44 inches in diameter.

"For the first three miles of the course of the canal from the river the soil conditions presented no serious difficulties in construction. From there to the head of the syphon the course of the canal was in light and ashy soil requiring the canal to be puddled and causing some breaks and slides. The excavation and filling was done with teams and scrapers.

"As a part of this construction work there were cuts two of which were approximately 26 feet in depth at their deepest point, one about 1500 feet and the other about 1000 feet, in length. Some fills also had to be made. The canal was constructed 16 feet on the bottom from the diversion point to the division of the canal at the point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. and from that point to the head of the syphon is now 10 feet on the bottom, all with side slopes of 1½ to 1 and with a depth of about 6 feet. The canal has a fall of .5 of a foot to a 1000 feet and a capacity of 150 c. f. s. in that portion with 16 inches bottom.

There is then set forth the structures along the canal and the devices installed for the purpose of water use. The expenditures upon the canal from 1901 to 1925 are set forth as $227,078.56, which expenditures are segregated as to their nature and as to the years in which they were made in an exhibit attached to the stipulation.

In the year 1910 the company entered into arrangements to receive sewage water from the City of Walla Walla. The stipulation provides:

"In the year 1910 the Company entered into arrangements to receive sewage water from the City of Walla Walla and during the years 1910, 1911 and 1912 expended $49,253.92 for concrete sewer pipe, $3954.02 for construction work, $1471.64 for engineering, and $1771.60 for rights of way, for the purpose of conveying such sewage water to the Company's canals. This water was used until the year 1924 when such use was discontinued and the works abandoned, with the exception of a small part of the concrete pipe used for a spillway from the canal. From about 1920 to 1924 the Company contracts for the sale of water contained the following clause: 'It is understood that sewage water from the City of Walla Walla is part of said water supply.'

"In the year 1907 the Company expended $798.00 in investigation of reservoir sites. No reservoir has been secured. The Company also expended for the drilling of wells the following sums: In 1905, $240.-50; in 1909 $6155.50; and from 1910 to 1913 the sum of $441.25, and in 1924 and 1925 the sum of $3149.08, making a total of $9980.33 expended for work in an attempt to develop an additional water supply from wells, which was without result.

"Water was first diverted from the river into the canal in the year 1893 for puddling purposes and turned out through the spillway into the West Little Walla Walla River. In the year 1898 water was first used for irrigation when 68 acres along the line of the canal were irrigated. In 1899, 20 additional acres were irrigated but these latter mentioned lands have since been abandoned. In 1901, 280 acres were irrigated in Oregon from the canal running from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon, and between 1901 and 1918, 72 additional acres in Oregon were irrigated from the canal, but the irrigation of these lands was discontinued in 1919, when the Company abandoned the operation of this canal. These lands are now irrigated from the

Milton-Freewater and Hudson Bay ditch. In 1898, 68 acres were watered from the canal; in 1899 20 acres additional were watered in Washington, which were later abandoned.

"In 1904, 193 acres were watered from the canal in Washington, including the 20 acres above mentioned as later abandoned. Approximately 1133.4 acres East of the syphon in Washington are now irrigated from the canal. The balance of the lands irrigated from the canal lie West and South of the syphon. Water was first run through the syphon in 1905 and used for irrigation."

There is then set forth by years the amount of irrigation company stock sold and the names of the individuals to whom said stock was sold. This tabulation shows that from 1898 to 1930 there was a continuous sale of the stock of the company which water shares so sold provide in total for the irrigation of 5793.09 acres, of which 372 acres have been abandoned, leaving water stock outstanding for the irrigation of 5421.09 acres, of which 216.56 acres are not now being irrigated. A survey by Oregon indicates that in 1933 there were irrigated from the system 4530.2 acres in Washington and 721.3 acres in Oregon, or a total of 5251.5 acres.

The soil west of the siphon is rich and with irrigation produces abundant crops. Approximately 85 families live on the land served by this irrigation system. West of the siphon is a church and a school employing two teachers.

## STIPULATION NO. 6

Stipulation No. 6 is merely a statement of the contentions of the parties as to the Gardena right.

STIPULATION NO. 7

Stipulation No. 7 is a statement of the parties as to their respective contentions as to water requirements upon the lands to which water has been awarded under the decrees of the courts and by the water administrators of the two states. It contains no statements of agreed fact.

STIPULATION NO. 8

This stipulation provides that the findings and orders of determination of the State Water Board or State Engineer of the State of Oregon, and the findings and reports of the Referee of the State of Washington, filed in the cases in which decrees are admitted in evidence, may be admitted in evidence as a part of the respective decrees.

STIPULATION NO. 9

This stipulation sets forth the contentions of the parties as to the wells from which water is used within the State of Oregon.

The State of Washington denies the right of the State of Oregon to grant permits for the sinking of wells without reference to the rights of the irrigators in the State of Washington. Broadly the State of Washington contends that by the sinking of the wells the sub-surface water is intercepted and the otherwise available supply of the river to Washington irrigators is diminished, and that the water produced by the wells is wastefully and not beneficially used. Oregon denies these allegations and alleges that they may capture the sub-surface water without regard to Washington rights; that the waters in the wells are mere percolating waters and that the owner of the surface land has

the right to capture them as a part of the property of the owner. Oregon contends that its permits to sink wells do not grant a water right; that the water right is already in the owner of the land, but that the permit is merely to record the use, and that such water right could not be interfered with either by the State of Washington or the State of Oregon. Oregon contends further that the waters intercepted are not a part of the stream flow of the Walla Walla River and do not in any way reduce the surface supply available in the State of Washington; that the digging of the wells and the expenditures incident thereto and to the production of the water is indicative of the inadequacy of the surface water supply.

STIPULATION NO. 10

This stipulation is in the nature of a supplemental pleading or an argument and sets forth the respective contentions of the parties as to adverse use, estoppel, vested rights, and the claim of Oregon that the Tum-a-lum River in the State of Oregon has been administered as a separate stream in the State of Oregon.

STIPULATION NO 11

This stipulation sets forth historically the political history of the states of Washington and Oregon and further that title to the lands now in private ownership within said two states has generally been acquired under the public land laws of the United States. Paragraph 3 of the stipulation materially limits the pleadings in the case in the following particular:

> "It is agreed that, for the purposes of this case, the individual rights of the respective land owners

and water users concerned in both states are governed by the doctrine of appropriation, and that no issue of riparian ownership as to such individual rights shall be raised in this case by either state."

## THE ISSUES

Under the pleadings as framed this court is required to decide:

(a) Is the State of Oregon depriving the State of Washington of the use of an equitable proportion of the waters of the Walla Walla River, a non-navigable interstate stream flowing within said two states?

(b) If so, to what extent?

(c) Shall an injunction issue restraining the State of Oregon from the wrongful diversion of the waters of the Walla Walla River?

## THE LAW APPLICABLE TO DIVISION OF WATERS OF INTERSTATE STREAMS

This suit is a bill in equity brought by the State of Washington against the State of Oregon as an original proceeding in this court to adjudicate the relative rights of the two states to the use of the waters of the Walla Walla River, a non-navigable interstate stream. Each state, under the allegations of the pleadings, claimed riparian rights for the lands adjacent to the stream and in addition thereto rights originating under the law of prior appropriation. After issue was joined the parties filed their stipulation containing among other provisions the following:

> "It is agreed that, for the purposes of this case the individual rights of the respective land owners and water users concerned in both states are governed

> by the doctrine of appropriation, and that no issue of riparian ownership as to such individual rights shall be raised in this case by either side." (Stip. No. 11.)

The case is to be adjudicated, therefore, as one in which each of the contending states has adopted the law of prior appropriation as to the origin of rights to the use of water.

The jurisdiction of this court to adjudicate such a controversy is supported by ample authority.

> Kansas v. Colorado, 206 U. S. 46.
> Wyoming v. Colorado, 259 U. S. 419.
> Connecticut v. Massachusetts, 282 U. S. 660.
> New Jersey v. New York, 283 U. S. 336.

The rules of law applied by this court in the determination of cases involving interstate streams, whether the rights sought to be protected arise under the doctrine of riparian right or under the law of prior appropriation, are stated by this court as follows:

*Kansas* v. *Colorado*, 206 U. S. 46, 97:

> "One cardinal rule, underlying all the relations of the states to each other is, that of equality of right. Each state stands on the level with all the rest. It can impose its own legislation on no one of the others and is bound to yield its own views to none. Yet, whenever, as in the case of *Missouri* v. *Illinois*, 180 U. S. 208, the action of one state reaches through the agency of natural laws into the territory of another state, the question of the extent and the limitation of the rights of the two states becomes a matter of justiciable dispute between them, and this court is called upon to settle that dispute in such a way as will recognize the equal rights of both and at the same time establish justice between them."

*Connecticut* v. *Massachusetts*, 282 U. S. 660, 669, 670:

> "The governing rule is that this court will not exert its extraordinary power to control the conduct of one state at the suit of another, unless the threatened invasion of rights is of serious magnitude and established by clear and convincing evidence."
>
> "For the decision of suits between states, federal, state and international law is considered and applied by this court as the exigencies of the particular case may require. The determination of the relative rights of contending states in respect of the use of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such states for the solution of similar questions of private right. *Kansas* v. *Colorado* 185 U. S. 125, 146. And, while the municipal law relating to like questions between individuals is to be taken into account, it is not deemed to have controlling weight.
>
> "As was shown in *Kansas* v. *Colorado*, 206 U. S. 46, 100, such disputes are to be settled on the basis of equality of right. But this is not to say that there must be an equal division of the waters of an interstate stream among the states through which it flows. It means that the principles of right and equity shall be applied having regard to the 'equal level or plane on which all the states stand, in point of power and right, under our constitutional system,' and that upon a consideration of the pertinent laws of the contending states and all other relevant facts, this court will determine what is an equitable apportionment of the use of such waters. *Wyoming* v. *Colorado*, 259 U. S. 419, 465, 470.

The suit of *Wyoming* v. *Colorado*, 259 U. S. 419, was brought by the plaintiff to prevent the diversion of water of the Laramie River arising in Colorado and flowing into Wyoming. Both states are in the arid region and apply the

doctrine of appropriation. The problem there presented was expressed by Justice Van Devanter as follows, page 470:

> "We are thus brought to the question of the basis on which the relative rights of these states in the waters of this interstate stream should be determined. Should the doctrine of appropriation, which each recognizes and enforces within her borders be applied? Or is there other basis which is more consonant with right and equity?"

After an elaborate discussion of the facts the court said:

> "We conclude that Colorado's objections to the doctrine of appropriation as a basis of decision are not well taken and that it furnishes the only basis which is consonant with the principles of right and equity applicable to such a controversy as this."

This doctrine was again announced in the case of *Connecticut* v. *Massachusetts*, 282 U. S. 660 at 672.

The rule adopted in the Wyoming-Colorado case as to priorities is not one of law, but one of equity. Under the conditions existing in that case such rule was applied as the measure best adapted to work out the equities between the parties.

Speaking in *Kansas* v. *Colorado*, this court says:

> "We must consider the effect of what has been done upon the conditions in the respective states and so adjust the dispute upon the basis of equality of rights as to secure as far as possible to Colorado the benefits of irrigation without depriving Kansas of the like beneficial effects of a flowing stream." 206 U. S. 100, 109.

In the case of *Kansas* v. *Colorado*, above cited, after having tabulated the growth in population, cultivation and

production which had accrued to the State of Colorado by virtue of the use of the waters involved in the controversy, the court uses this language:

> "Whatever has been effective in bringing about this development is certainly entitled to recognition, and should not be wantonly or unnecessarily destroyed or interfered with. That this development is largely owing to irrigation is something of which, from a consideration of the testimony there can be no reasonable doubt. It has been a prime factor in securing this result, and before, at the instance, of a sister state, this effective cause of Colorado's development is destroyed or materially interfered with, it should be clear that such sister state has not merely some technical right, but also a right with a corresponding benefit." id. 109.
>
> "It cannot be denied, in view of all the testimony (for that which we have quoted is but a sample of much more bearing upon the question), that the diminution of the flow of water in the river by the irrigation of Colorado has worked some detriment to the southwestern part of Kansas, and yet, when we compare the amount of this detriment with the great benefit which has obviously resulted to the counties in Colorado, it would seem that equality of right and equity between two states forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation." id. 113.

No state can legislate for or impose its own policy upon another state, nor can the decrees entered in one state have any binding effect upon persons who were not parties thereto.

> Kansas v. Colorado, 206 U. S. 46.
> Nebraska Inv. Co. v. Corlett (Wash.) 172 Pac. 851.
> Savage v. Tacoma (Wash.) 112 Pac. 78.
> Savage v. McCorkle (Ore.) 21 Pac. 444.
> Carnes v. Dalton (Ore.) 110 Pac. 170.

In the Wyoming v. Colorado case, (at pp. 464, 465) this court, in commenting on the Kansas v. Colorado case, used the following language:

> "* * * As respects the scope and interpretation of the ultimate conclusion in that case it should be observed, first, that the court was there concerned, as it said, with a controversy between two States, 'one recognizing generally the common-law rule of riparian rights' and the other the doctrine of appropriation; secondly, that the diversion complained of was not to a watershed from which none of the water could find its way into the complaining State, but quite to the contrary; and thirdly, that what the complaining State was seeking was not to prevent a proposed diversion for the benefit of lands as yet unreclaimed, but to interfere with a diversion which had been practiced for years and under which many thousands of acres of unoccupied and barren lands had been reclaimed and made productive. In these circumstances and after observing that the diminution in the flow of the river had resulted in 'perceptible injury' to portions of the valley in Kansas, but in 'little, if any, detriment' to the great body of the valley, the court said, 'it would seem equality of right and equity between the two States forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation;' * * * What was there said about 'eqality of right' refers, as the opinion shows (p. 97), not to an equal division of the water but to the equal level or plane on which all the States stand, in point of power and right, under our constitutional system. * * *"

## THE FACTS

### Develpoment in Washington

Washington's Exhibit No. 17 is a map of the area involved in this litigation and shows the interrelated streams

making up the Walla Walla River and available for the irrigation of the lands involved in the controversy. The City of Walla Walla is the center of a highly developed agricultural area. (Stip. No. 3). There have grown up in and about it such industries as its raw material and its market can sustain. It must be quite evident that the agricultural and industrial development of the area involved has proceeded without regard to state lines. As this development has progressed more lands have been made available for irrigation than the dependable water supply will now adequately irrigate. Without protest, so far as the record shows, the City of Walla Walla, Washington, went into the State of Oregon at the headwaters of Mill Creek, a tributary of the Walla Walla River, and secured for itself a dependable supply of water for domestic and culinary uses. While this water right is not in controversy, the fact of its development and use indicates that the State of Oregon had permitted water from the available supply to be taken, appropriated and used exclusively within the State of Washington. At the same time this use was being developed along the Mill Creek branch of the Walla Walla River, lands were being brought under cultivation along Mill Creek and its tributaries. Coincident with this development in the State of Washington farmers in the State of Oregon were applying the waters of the Oregon tributaries to irrigable lands in that state. The two developments were coincident. The City of Walla Walla was the largest community to grow out of the productivity of the combined area. The industries were largely centered there and the profits accruing from the interchange of raw materials for merchandise built up and developed that city. The record discloses no purpose, as this development proceeded, to devote water to lands which would be taxable only within one State or the

other. Both communities were more interested in the benefits accruing from the general development than from a competitive effort to develop one community against another.

**Development in Oregon**

The record does not disclose whether, at some time prior to the settlement of the Oregon area, the Little Walla Walla River or the Tum-a-lum River was the main channel through which the waters arising above the division of the Walla Walla River into the Little Walla Walla and the Tum-a-lum were carried north into Washington. Whatever the fact may be in that particular, it is apparent from the testimony that at least as early as 1880 the Tum-a-lum River carried the principal flow of the water north across the Washington line. All of the streams contributing to the Walla Walla River are supplied in the main from the snow falling during the winter period in the Blue Mountains. With the warmer temperatures of spring these snows are melted and the streams carrying off this water attain their highest stream flow. As the temperature is variable, so the stream flows are variable. They vary not only between the spring and the summer, but they vary from day to day and from month to month. Warm winds and sunshine give them a large supply and colder weather shrinks them. The summer rains covering 150 square miles of drainage area are gathered into these streams and augment their flow.

An agricultural community cannot develop and maintain itself upon sporadic supplies of water. The farmer must be able to place reasonable dependance upon the water supply if he shall make the expenditures and put forth the effort necessary to reap the harvest incident to the combination of the soil with the water. The evidence discloses that the bed of the Tum-a-lum River in Oregon, lying between the Nursery Bridge in the NE¼ of the NW¼ of

Section 1, Township 5 North, Range 35 East, and the McCoy Bridge on the line between Sections 24 and 25, Township 6 North, Range 35 East, varies in width from 150 to 1500 feet, and runs through cobble rocks underlain to great depths with gravel. The evidence does not disclose whether or not in this area of the river, during the low water period and prior to irrigation or diversions, there moved any substantial amount of surface water. It is conclusively shown, however, that this channel is an extremely wasteful channel. In order to avoid this waste and to make the waters of the Tum-a-lum River available for use within the State of Oregon the irrigators began as early as 1880 to put crude and temporary dams across the channel of the river at the Red Bridge in the SW¼ of the NE¼ of Section 12, Township 5 North, Range 35 East, and thereby and thereafter during periods of low water, diverted all of the waters of the Walla Walla River into the channel of the Little Walla Walla River, permitting to flow by said dam only that small quantity of water necessary to supply the right of the East Side ditch, which takes out of the river just below the dam. This action upon the part of Oregon irrigators, at least from 1880 until the date of the trial of this action, rendered the channel of the Tum-a-lum River, between the Nursery Bridge and the McCoy Bridge, dry. (Or. Abs. Froiseth, pp. 25, 26), Fee (id. pp. 40, 41), Alta Rogers (id. pp. 33, 34), Elba Rogers (id. p. 28), Charles Schwald (id. pp. 32, 33), Mason (id. p. 54), Burlingame (id. pp. 21, 22), Roeder (id. p. 41), Perry (id. p. 47). The evidence is uncontradicted that each year from 1880 to 1930, when the spring high water ceased, the irrigators within the State of Oregon continuously and without interruption and without protest, appropriated to their use all of the flow of the Walla Walla River arising above the Red Bridge.

Dr. Woodburn, a witness for the State of Washington, (R. p. 441) in discussing this question testified:

> "Q. And in the months of June, July and August the stream between the Nursery Bridge and the McCoy Bridge is naturally a falling stream, isn't it?
>
> A. No, it has already fallen. There is no water there.
>
> Q. And would you consider it an economical method of distribution of water to attempt to get 22 second feet down the Tum-a-lum Branch during June, July and August?
>
> A. Well, it isn't a good irrigation canal if that is what you mean. It is a natural stream bed, which is broad in spots, and the water would be somewhat dispersed. It is not an ideal irrigation canal by a long shot."

The use of the water in the State of Oregon was with the knowledge of many of the irrigators within the State of Washington. (Wash. Abs. pp. 41, 42, 52, 64, 67; Or. Abs. p. 121). The testimony shows that as early as 1891 there was being irrigated from the Walla Walla River, through the Little Walla Walla River, within the State of Oregon something more than 2200 acres of land. (Stip. No. 3). Whatever this amount of land was, the diversion of the water of the Walla Walla River at the Red Bridge was complete and continuous. The use may not have been as economical as modern irrigation methods, in a developed agricultural district, would dictate, but the fact remains that all of the water was taken and that it did not during the same period, return directly to the channel of the Walla Walla River through the Ford branch or the Crocket branch, which are the channels which would have conducted any excess diversion back into the main river. (Wash. Ex. 17, Or.

Abs. pp. 3, 7, 33, 34, 42, 48). The wastefulness of the channel of the Tum-a-lum River between the Nursery Bridge and the McCoy Bridge is illustrated by actual experiments set forth in the record. Orin Bowman, a witness called by the State of Oregon, (Or. Abs. 24), testified that he has had charge of distributing the water for the Hudson Bay Canal since 1920; that in 1928 there was turned over the dam at the Red Bridge 25 c.f.s. of water, and that after forty-eight hours this substantial quantity of water had not reached the McCoy Bridge. W. C. Mason, deputy water master on the Little Walla Walla River since 1923, (Or. Abs. pp. 54, 55) testified that on November 1, 1933, 21 c.f.s. was turned past the dam and 25 feet was turned down on November 2nd, the following day, and that the waters so turned ran, during the forty-eight hour period only one-half mile below the Nursery Bridge. Aubrey E. Perry, an irrigation engineer employed by Oregon, testified (Or. Abs. p. 48) that in 1928, 25 second feet was turned below the dam at the Red Bridge and that at the end of three or four days none of this water had reached the McCoy Bridge. Burlingame, a witness for the State of Oregon, testified as follows:

> "Q. Mr. Burlingame, the development there upon Gardena, was that largely completed at the time you left the company and got out of the company?
>
> A. Yes, sir.
>
> Q. And before the Gardena Farms District was organized?
>
> A. Yes, sir.
>
> Q. You left the company at the time the Gardena Farms District was organized, did you?
>
> A. No, sir.
>
> Q. Before that?
>
> A. Before that.
>
> Q. Can you tell us when?

A. I think it was in '30. I am not sure.

Q. In 1930?

A. Yes.

Q. And the development prior to that, had you had any water from Oregon during the short season—now, when I say "water from Oregon" I am referring to water that comes down the Tum-a-lum River—had you had any water down the Tum-a-lum River for the purpose of making any of that development there during the short season, the months of July and August and late June?

A. Only what runs under the bridge there and what comes through those spring branches that run to the headgate.

Q. Now, Mr. Burlingame, when you say what water runs under the bridge you refer to that that rises at the McCoy Bridge?

A. Yes.

Q. And when we refer to the springs you mean Big Spring and East Spring?

A. Yes.

Q. Or the East Prong, called the East Little Walla Walla in Washington, isn't it?

A. Yes, sir.

Q. And there is a McEvoy Spring Branch that runs in there too, is there not?

A. Well, there's numerous springs that head in above the headgate.

Q. Mr. Burlingame, do you know the first year that rights up Yellowhawk and up Mill Creek were shut off for the purpose of allowing the priority to Gardena?

A. I know it was done, but I can't remember the date.

Q. Was that done before or after you left the company do you recall?

A. I think it was done before."

Dr. Woodburn testified that in June, 1932, he and Mr. Humphrey were making a joint study of the stream and

that 20 c.f.s. of water passed the bridge but did not go across the dry area, but might have gone under it. (Wash. Abs. 142).

During the period when the channel of the Tum-a-lum River from the Nursery Bridge to the McCoy Bridge has been dry after the recession of the high water, the area lying two miles to the south of the Washington-Oregon State line has continued to produce a substantial amount of water available for the irrigation of Washington lands. Wash. Ex. 30, page 12, shows that in 1933, in July and August, when the channel of the Tum-a-lum River had been completely shut off at the Red Bridge, there was a flow across the state line into Washington of from 12 to 22 second feet of water.

The foregoing recitals impel two conclusions: First, that for more than fifty years last past, during the summer irrigation season, the Oregon irrigators have appropriated to themselves all of the flow of the Walla Walla River at the Red Bridge and permitted none of it to go on down to Washington users; and second, that to permit quantities of water to flow past the Red Bridge during the low water stages of the river is wasteful and uneconomic. During the period when Oregon was so diverting the water away from the Tum-a-lum River, and into the Little Walla Walla River, the State of Washington, as shown by the tabulation of the decrees of the states of Washington and Oregon (Or. Abs. 9) and the stipulations on file herein, has continuously increased its irrigated acreage at substantially the same rate that Oregon has increased its irrigated areas. (Or. Brief, p. 16).

## THE GARDENA FILING

On the 24th day of July, 1891, J. T. Kirk, J. F. Boyer and W. F. Courtnay filed a notice of intention to appropriate 500 cubic feet per second of time "of the waters of the Walla Walla River now in said river at the place opposite where this notice is posted." (Stip. No. 5). Apparently this notice lapsed or was subject to lapse, because of failure to begin work within the period provided by the law of the State of Washington. Successive notices of intention to appropriate water from the Walla Walla River were thereafter filed in February, 1892, and in July, 1892. Almost immediately after the filing of these applications E. C. Burlingame organized and became the head of the Walla Walla Irrigation Company, which company succeeded to the above mentioned applications, and proceeded to make surveys, begin the construction of canals and ultimately to take water from the Walla Walla River for irrigation purposes. The original applications for the use of this water show that the lands to be irrigated lie within the State of Washington and the State of Oregon and include large areas of land unindentified except by township and range. (Stip. No. 5, Exs. "B", "C" and "D"). The main diversion canal took out of the Walla Walla River, as shown upon Washington's Ex. 17, at a point in the McBean Donation claim and below the point where Stone Creek, Yellowhawk Creek and the East Little Walla Walla River flow into the main channel of the Walla Walla River and continued westerly a distance of about twelve miles to a tract of some seven thousand acres of land delineated upon Wash. Ex. 17 as "Gardena Tracts." In 1928 an irrigation district was formed, under the Washington law, known as the Gardena Farms District, which district acquired all of the water rights of the Walla

Walla Irrigation Company. During the period between 1892 and 1928 there was expended upon this project, as set forth in Ex. "F" attached to Sitpulation No. 5, the sum of $227,078.65. This development resulted in the awarding by the Washington court, to said Walla Walla Irrigation Company and its successors, the Gardena Farms District, a water right on the Walla Walla River with a priority of 1892, but which priority had certain marked limitations. This certificate of water right was granted in an action entitled, "State of Washington, Plaintiff v. Charles Ackerson, et al, Defendants," filed in the Superior Court of the State of Washington for the County of Walla Walla. (Stip. No. 5, Ex. "A") (Wash. Ex. 11, page 69). This water right is set forth in the decree (Wash. Ex. 11, pp. 76 and 146) as follows:

> "'That claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the referee, to wit: on the 29th day of March, 1926, is entitled to the use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st; 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said lands may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics.'"

Paragraph 14 of the decree at page 146, provides:

> "'That a superior right on the Walla Walla river or any of its tributaries runs against all inferior rights on the tributary to which said right is attached as well as against all inferior rights on tributaries entering the stream above the point of diversion of such right except that prior class rights of the Walla Walla Irrigation Company will not run against inferior class rights on either Mill Creek or Garrison Creek by conveyance of water through Yellowhawk Creek, nor will the prior class rights of the Attalia Irrigation District run against inferior class rights for lands located in the Walla Walla valley. A superior right does not run against inferior rights on other tributaries that enter the stream below the point of diversion of said superior right.'"

On pages 72, 73, and 74 of that decree, under class 30, with 1892 priority, are claims Nos. 588, 590, 591, 592, 594, 611, 614, 615, 617, 624, 606, 607, 608, 609, 610 and 619 (a total of 1,095 acres), followed by a note on page 74 which refers to these proof numbers and says:

> "NOTE: By virtue of the decree in the case of the Lowden Company et al. v. The Walla Walla Irrigation Company, records of this court, all rights of the above named claimants in this class taking water from the Walla Walla river are prior to that of the Walla Walla Irrigation Company given in Class 30."

In Class 31, under priority of 1893, on pages 77, 78, 79 of that decree, are found proof numbers 593 and 599 for a total of 388.96 acres. And following them is a note which reads as follows:

> "NOTE: Under provisions of the decree in the case of the Lowden Company et al. v. The Walla

> Walla Irrigation Company, records of this court, all the above lands included in this class taking water from the Walla Walla river are entitled to a priority over the lands included in the claim of the Walla Walla Irrigation Company."

To this action the State of Oregon was not a party and no irrigator within the State of Oregon was a party.

The record shows that the development of the Gardena project beginning in 1892 was slow and intermittent. (Stip. No. 5). It was financed in two ways: First, by the effort of Mr. Burlingame, its head, and second, by the sale of stock. The evidence shows without dispute that from 1892 to the year 1930, there was no claim of right and no exercise of a right to have the Oregon irrigators, after the period when the flow of the stream had so receded that all of it was diverted to supply the Oregon requirements, turn water past the Red Bridge for use within the State of Washington.

Coincident with the development of Gardena, and after 1911, Burlingame, (Or. Abs. p. 21) the President and large owner of the Walla Walla Irrigation Company, was also interested in and operating another canal beginning at a point in the State of Oregon on the Tum-a-lum River below the Red Bridge. This development was the Hudson Bay Canal, which runs west from the point of diversion for a distance of substantially ten miles. The Hudson Bay right in the Oregon decrees is given a priority of 1903. It is based upon the right of the Hudson Bay Company to have the use, during the winter and early season, of the water of the Tum-a-lum River. The water if so used is in derogation of the right of the Walla Walla Irrigation Company to have water flow down the Tum-a-lum to supply the uses under the Gardena appropriation. At no time did the Walla

Walla Irrigation Company deny the right of the Hudson Bay Company to take into its canal the quantity of water decreed to it under the Oregon decrees. Mr. Burlingame was for a long period in charge of both companies at the same time. This conduct upon the part of Burlingame impels but one conclusion—that never at any time after the original appropriation of 1892 did the Walla Walla Irrigation Company rely upon or claim right to the use of the waters of the Walla Walla River above the Red Bridge. The Hudson Bay right is a secondary right. The record shows that upon the recession of the high waters, the Hudson Bay use is discontinued. (Wash. Ex. 27). In this connection it is further significant that during the period of high water the Washington users do not need to impinge upon the Oregon uses. (Barney, Wash. Abs. 36; Wash. Ex. 27, Wash. Ex. 18 p. 11 et seq., p. 120 et seq.).

The evidence shows that during the years 1929, 1930, 1931, 1932 and 1933 when the Washington Water Master began the regulation of water within the State of Washington and shut off Washington appropriators with priorities subsequent to 1892 the Hudson Bay Ditch was substantially dry and the Gardena Canal was still getting practically its decreed amount. In other words, when the Gardena project was short of water the Hudson Bay Company had been cut down to a point where its draft upon the river was negligible.

Bowman testified (R. p. 516) that in 1919 he went to work for the Milton-Freewater and Hudson Bay Irrigation Company; that in 1920 a headgate was constructed in the channel of the Tum-a-lum River under the direction of Carl Hartvedt, Superintendent of the Gardena project, which headgate was designed to divert the waters of the Tum-a-lum River into the Hudson Bay Canal. This of course was ample

notice of the intention of the Hudson Bay Company to take the water and that it was taken with the knowledge and consent of the Walla Walla Irrigation Company.

The high water in the Washington tributaries to the Walla Walla River during the period of flush flow was sufficient to supply the demands of all of the Washington users, and after the secondary rights on the Oregon side were all shut off, the Washington users were still unregulated and using such quantity of water as their necessities might dictate. (Barney, Wash. Abs. 36, Wash. Ex. 27, Wash. Ex. 18, p. 11 et seq., p. 120 et seq.). There can be no question but that through all the years from 1892 until 1930, Burlingame, President of the Walla Walla Irrigation Company, knew that when the waters receded from their spring flow, the Oregon users appropriated the entire stream. When, on the 24th of July, 1891, Mr. Kirk, Mr. Boyer and Mr. Courtnay posted their notice of intention to appropriate, the entire flow of the Walla Walla River in the State of Oregon above the Red Bridge had been diverted into the Little Walla Walla River and was not then passing the point where the notice was posted and never thereafter passed or flowed to that point of diversion during the months of late June, July and August. In 1930 we have evidence of the first claim upon the part of the State of Washington or its irrigators that the conduct of the State of Oregon, in the complete and exclusive use, during the summer season, of that part of the Walla Walla River flowing above the Red Bridge, is in derogation of the rights of Washington irrigators. Wash. Ex. 24, a telegram from the State Engineer of the State of Washington to the State Engineer of Oregon, reads as follows:

"April 23, 1930.

Rhe Luper, State Engineer
Salem, Oregon

Just advised entire Walla Walla River being diverted at Freewater.

Charles J. Bartholet."

On the same day a telegram, Wash. Ex. 25, was sent as follows:

"Rhea Luper
Salem, Oregon

Will you take steps to enforce a more economic use of water from Walla Walla River in Milton and Freewater sections or cause a regulation which will give Washington water users waters to which they claim they are entitled Stop Complaint comes from Water Master and Walla Walla Irrigation District.

Charles J. Bartholet."

To this the State Engineer of the State of Oregon replied on April 24, 1930, Wash. Ex. 26:

"Believe it has always been customary to divert in Oregon the entire flow of the Walla Walla River. After such diversion, return seepage has supplied the Washington side. We have no authority without court order or compact to recognize rights outside of State.

Rhea Luper, State Engineer."

It is significant that as late as 1930 the State Engineer of the State of Washington, in charge in that state of the distribution of waters, and particularly of the Gardena Farms District, should wire to the State of Oregon, not to claim a priority for the Gardena lands, but to insist upon a more economic use of the waters by the irrigators within the State of Oregon. (Barney, Wash. Abs. 39).

When on April 23, 1930, the first of the above telegrams was sent, the Gardena Canal had been receiving since April 1, 116 c.f.s. of water under a decree allowing it but 66.67 c.f.s. during this period, and on April 22nd, the day before that telegram was sent, the amount of water the Gardena Canal was receiving had been reduced to 68 c.f.s., an amount still near its decreed right. (Barney, Wash. Abs. 39, Wash. Ex. 18, p. 21). In 1930 the Washington water master, Barney, did not begin to regulate Washington users until June 10th and did not close all rights with priorities subsequent to 1892 until July 6th. (Wash. Ex. 27).

Notwithstanding the fact that the State of Washington now contends that at all times the State of Oregon has diverted waters from the Walla Walla River to which its users, and particularly the Walla Walla Irrigation Company, were entitled, the Walla Walla Irrigation Company, needing additional water, spent during the years 1910, 1911 and 1912, the sum of $56,451.18 to secure sewage water from the City of Walla Walla for the irrigation of its lands, and during the years 1905, 1909, 1910, 1913, 1914 and 1925 spent approximately $10,000 in drilling wells in search of a new water supply. So far as the evidence shows, during all of this period until 1930, on no occasion did the State of Washington or any of its irrigators assert a claim to, or make an effort to secure, the use of waters arising above the Red Bridge during the low water period.

Paragraph II of Stipulation No. 3 indicates that the rights of the Milton-Freewater and Hudson Bay Company and of the Gardena project have been recognized as inadequate for summer irrigation. Each Company has resorted to winter irrigation in order to provide against summer

water shortage. The Washington court decreed to Gardena a winter irrigation right of fifty second feet of water. This practice must result from the fact that other claimants have exercised the right to the prior use of the water during the irrigation season.

In 1891 the law of the State of Washington controlling the appropriation of waters contained the following provisions:

> "'(2) Notice of Appropriation. Any person, persons, corporation or association desiring to appropriate water must post a notice in writing in a conspicuous place at the point of intended storage or diversion, stating therein: (1) That such appropriator claims the water there lying, being or flowing to the extent of one cubic foot of water per second of time, or some multiple or some fractional portion thereof; (2) The purpose for which said water is appropriated and the place or places, as near as may be, of intended use; (3) the means by which it is intended to store or divert the same; (4) a copy of the notice must, within ten days after it is posted, be filed for record in the office of the county auditor of the county in which it is posted. (L. 1891, p. 327, Sec. 2; Rem.—Bal., Sec. 6317.)
>
> "'(3) Construction of Works, When to Begin. If said use is by storage, the appropriator must, within three months after the notice is posted, commence the construction of the works by which it is intended to store the same. If said use is by diversion, the appropriator must, within six months after the notice is posted, commence the excavation or construction of the works by which it is intended to divert the same; *it being herein expressly provided that such works must be diligently and continuously prosecuted to completion, unless temporarily interrupted by the elements.* (L. 1891, p. 328, Sec. 3; Rem.—Bal., Sec. 6318.)

"'(4) Vested Right—Forfeiture by Non-Compliance. '*By a strict compliance with the above rules,* the appropriator's right to the use of the water actually stored or diverted relates back to the time the notice was posted; but *a failure to comply therewith deprives the appropriator of the right to the use of the water* as against a subsequent appropriator who faithfully complies with the same. (L. 1891, p. 328, Sec. 4; Rem.—Bal., Sec. 6319.)'"

As shown by Ex. No. 5, in 1898 the Walla Walla Irrigation Company began the sale of stock entitling the holder to the use of water and continued the sale of such stock until the year 1930. This stock entitled its owner to a pro rata share of the water belonging to the Company. During the entire period no water user was delivered any water arising on the Oregon side above the Red Bridge when the water so arising was necessary to meet the requirements of Oregon users. Instead of resorting to their claim against Oregon, the Company first secured the right to the use of the sewage water of the City of Walla Walla and then undertook to increase its water supply by the drilling of wells.

In 1917 the Public Service Commission of the State of Washington appointed Hartvedt to take charge in their behalf of the Walla Walla Irrigation project. (Wash. Abs. page 69). At that time water stock had been issued for 2245 acres of land. (Wash. Abs. 70). This stock so issued was given a preferential right, and called Class "A" stock. Stock thereafter issued was denominated Class "B" stock, and such Class "B" stock had a right secondary to Class "A" stock. This action of the State of Washington, through one of its instrumentalities, is significant. Without calling for water from the State of Oregon it then recognized an inadequate right for this project—a high water or flood

right as to all lands in excess of 2245 acres. (Wash. Abs. page 70).

This conduct seems entirely inconsistent with the present claim made by the plaintiff state. The complaint in this case alleges and by stipulation it is agreed, that during the past eight or ten years there has been a marked shortage of water in the Walla Walla River and its tributaries. With the failure of the sewage supply and the failure of the wells to produce and the shortage of the water in the water shed generally, the State of Washington, for the first time in 1930 made its demand upon the State of Oregon for an economical use of waters within that state.

A water right is finally perfected and fixed by the application of the water sought to be appropriated to a beneficial use. The following cases and texts set forth the law upon this subject:

*In re Water Rights in Silvies River*, 237 Pac. (Or.) 322, 336.

> "As a general rule, to constitute a valid appropriation of water, three elements must exist: (1) An intent to apply it to a beneficial use, existing at the time or contemplated in the future; (2) a diversion from the natural channel by means of a ditch, canal, or other structure; and (3) an application of it within a reasonable time to some useful industry."

*Sowards* v. *Meagher*, 108 Pac. (Ut.) 1112, 1116:

> "The three principal elements to constitute a valid appropriation of water, and, as stated by the court in the case of Low v. Rizor, 25 Or. 557, 37 Pac. 82, and approved by the same court in the case of the Nevada Ditch Co. v. Bennett, 30 Or. 59, 45 Pac. 472, 60 Am. St. Rep. 777, are: '(1) An intent to apply it to some beneficial use; (2) a diversion from the natural channel by means of a ditch, canal,

or other structure, and (3) an application of it within a reasonable time to some useful industry.'"

Continuing in this case, the court uses this language: (p. 1117):

> "Whatever else is required to be or is done, until the actual application of the water is made for a beneficial purpose, no valid appropriation has been effected. This was so before the statute, and it is still so under the statute. The filing of the application with the state engineer, as required by the statute does not establish an appropriation of water. It but takes the place of, and is, the preliminary notice of intention to appropriate. Unless the construction of the works are commenced and completed within the time allowed by the engineer, and the water diverted and applied to the beneficial purpose of the proposed appropriation the filing of the application is for naught, and no completed valid appropriation has been made."

*Sander* v. *Bull*, 135 Pac. (Wash.) 489, 491:

> "Appropriation of water consists in an intention to appropriate followed by reasonable diligence in applying the water to a beneficial use."

*In re Water Rights in Alpowa Creek, etc.*, 224 Pac. (Wash.) 29, 31:

> "An appropriation of water consists of an intention to appropriate followed by a reasonable diligence in applying the water to a beneficial use."

*Kendall* v. *Joyce*, 93 Pac. (Wash.) 1091.

In this case the court holds that one who, at a time when the law did not authorize it, filed a notice with the auditor of the county reciting that he claimed 500 inches of water from a stream at a certain point and an additional

500 inches at a certain other point, but did not divert the water and apply the same to beneficial use within a reasonable time, acquired no rights.

*Wrathall* v. *Johnson,* 40 Pac. (2d) (Ut.) 755, 783:

> "Essential to the appropriation is that of use. An appropriation is the act of turning, setting aside, taking possession of, or applying to a particular use a definitely ascertained quantity of water to a particular and beneficial purpose."

67 C. J. page 982:

> "The right initiated by notice is an inchoate right until perfected. This inchoate right may be lost by failure to perfect or by abandonment."

*Wiel's Water Rights in the Western States,* Third Edition, Vol. 1, page 406:

> "Sec. 376. NOTICE ALONE NOT ENOUGH.—It need hardly be said that merely posting a notice is not enough unless the other requisites of a bona fide intent, diligence and completion, are also complied with. It is well settled that the posting of a notice gives no rights if the other requisites are not complied with."

*Id.* P. 430:

> "* * * and this has been followed generally in the desert States and became the accepted form of statement, viz., that there can be no appropriation until the actual use is made.'

Note, P. 430:

> " 'The final step, and the most essential element, to constitute a completed valid appropriation of water, is the application of it to a beneficial purpose. Whatever else is required to be or is done, until the actual

> application of the water is made for a beneficial purpose, no valid appropriation has been effected.' Sowards v. Meagher (Utah, 1910), 108 Pac. 1113. Hagerman Co. v. McMurray (N. M.), 113 Pac. 823."

During the period after the recession of the high waters in the tributaries of the Walla Walla River, none of the waters arising above the Red Bridge were ever applied to a beneficial use within the State of Washington. The record further shows, as herein elsewhere cited, that quantities of water as much as 25 second feet, half of the Gardena right after July 1st, turned over the dam at the Red Bridge completely sank into the river bed. There is no convincing evidence that water so sinking is again available for use to the Washington appropriators. There is no showing in this case that the diversion of the water at the Red Bridge and its application to the irrigation of lands adjacent to the river is more detrimental to the users within the state of Washington than to have the same amount of water turned past the Red Bridge to sink into the channel of the Tum-a-lum River between there and the McCoy Bridge.

The testimony of witness Piper, who, for the parties hereto made a study of the subject of underground water, would indicate that the use of the water on the lands to the west of the Tum-a-lum River does not remove the return water materially more to the west than would occur if the waters were permitted to sink in the channel of the Tum-a-lum River. (Or. Abs. pp. 74, 75).

In the case of *U. S.* v. *Haga*, 276 Fed. 41, Judge Dietrich had before him a controversy between an appropriator on a tributary and a prior appropriator on the main stream. The facts in the case are analogous to the facts in this case. In that action the court sets forth the following conclusion:

"(1) While, as already stated, the creek is constructively a tributary of the river, there is no showing that naturally, during the irrigation season, it actually makes any contribution to the river flow. There is a continuous channel, it is true, and there are doubtless short periods of unusual run-off in extraordinary seasons when there is a discharge into the river; but the showing is insufficient to warrant a holding that the older diversions from the river have any substantial beneficial interest in the creek. An appropriator from a main channel can complain of a diversion from a 'tributary' only if and when such tributary would, if not interfered with, make a valuable contribution to the main stream.

"(2) In the second place, there is no warrant for finding that in normal seasons there is any natural flow in the creek later than June 1st, whereas up to about July 1st, and sometimes to a later date, there is an abundance of water in Boise river proper for the supplying of all rights therein, and hence the use of the creek by the defendant infringes no appropriator's right. It follows that plaintiff is not in any way injured by the defendant's diversion of the natural flow of the stream."

The Washington court in fixing the limitations upon the Gardena right must have proceeded upon the same theory as that adopted by Judge Dietrich. It will be observed in the decree that the Gardena right is given a priority of 1892, except that certain users with priorities subsequent to 1892 were made prior in right to the Gardena right. In this case the Walla Walla River above the Red Bridge contributes nothing to the main stream of the Walla Walla River after the stream has so receded that the flow of the river at the Red Bridge is required for Oregon irrigators. This condition has persisted since 1880.

The record in this case is without dispute that from

1892 until the date of the trial of this case those claiming the right to irrigate the Gardena tract have not applied any of the waters of the Walla Walla River, arising above the Red Bridge, during the low water period, to the irrigation of their lands, and that during the high water season their rights have been adequately supplied by the Washington tributaries.

The Gardena Farms District right is the only substantial right in the State of Washington which diverts water directly from the Walla Walla River. Other Washington rights are along the spring branches which rise on the Oregon side. These are the water sources referred to by Dr. Woodburn in his testimony as accruing at the margin of the gravel fan where the water table intersects the surface. They rise and fall with the river and with irrigation. They are outlets of underground water. All of the evidence in the record upon the subject shows that Oregon has, to the extent that it has required them, used these small spring branches to irrigate the adjacent lands and has maintained tight dams across them. (Or. Abs. 27, 31, 34, 41, 48, 55.) The Washington court found in 1928 in the Ackermann case, in which case the Washington rights to the use of the waters of the Walla Walla River were adjudicated, that the use of water on the Oregon side is a benefit and not a detriment to Washington users. (Wash. Ex. 11, p. 4, of Referee's Report.) The language of the referee in that case, as adopted by the court, is:

> "The many springs which are involved in this case are fed by water which is applied to lands along upper Mill creek and along the Walla Walla river on the Oregon side of the state boundary line. The early use of such water when the supply is usually abundant serves a double purpose, as a large percentage of it returns to the streams and becomes available

for use on lower lands later in the irrigation season thereby greatly increasing the acreage which can be irrigated from the available water supply."

The doctrine of estoppel may be material as fixing the intention of the Washington appropriators. It is conclusively shown that the Washington users never have had the use of the water for which they now contend, therefore they could not have abandoned such right of use. If the doctrine of abandonment were to be invoked in this case it would have to be applied to the right to perfect an appropriation. In order to so apply the doctrine of abandonment it would be necessary first to find that the appropriators in 1901 and 1902, when they posted their notices of intention, and thereafter while they were constructing their canals, had the purpose to take and use the water then being diverted in Oregon and, under the law and with due diligence to apply the same to beneficial use within the State of Washington. Such intention is not shown by the evidence or the conduct of the claimants.

## WATER USES WITHIN THE STATE OF OREGON

It is contended by the State of Washington that the water diverted by Oregon from the Walla Walla River is wastefully used. The water rights within the State of Oregon have all been the subject of adjudication by the Oregon courts. (Or. Decrees, Wash. Exs. 1 to 9, inclusive). In these decrees the court has fixed not only the priorities of use, but in order to make the relative priorities available has also fixed and limited the quantities of water to be used during the irrigation season under the different rights. The Youngs Soil Map (Wash. Ex. 15), a joint soil survey, sets forth a classification of the soils irrigated in both states.

The witnesses of both parties, in fixing water requirements, address themselves to the soil conditions as found by Youngs.

For the purpose of determining whether or not the amount of water decreed to the users under the Oregon decree is a proper allowance, Ed. K. Humphreys, an engineer employed by the State of Oregon, selected a series of typical farms on the varying soils in the Oregon area, as shown upon the Youngs map, put in measuring devices and proceeded, during the irrigation season of 1933, to supply what was considered an adequate amount of water for the irrigation of each particular piece of such land. The losses in transit were measured, the amount of water was measured, the land was measured, the crop conditions were observed, and from the data so obtained the water requirements under the existing conditions as to each tract of land were deduced. (Humphreys, Or. Abs. pp. 85, 86; Humphreys, R. 867).

Quantities of water applied were substantially the amounts allowed by the Oregon decrees. (Or. Abs. 85.) Each of the farmers upon the test places testified that the quantity of water delivered, where available through the irrigation season, was a quantity of water necessary to the proper irrigation of the lands involved. (Warren Roeder, Or. Abs. 41; C. E. Herr, Or. Abs. 62; George Knopf, Or. Abs. 61; C. J. Karker, Or. Abs. 76; D. H. Babcock, Or. Abs. 77; Charles Eiffert, Or. Abs. 79; Clifford B. Harris, Or. Abs. 82; Lloyd Bookout, Or. Abs. 82; W. H. P. Herman, Or. Abs. 83.) Taking eight of the test places, the average use of water during July was 2.52 acre feet per acre. During August it was 2.09 acre feet per acre, making a mean flow for the months of July and August of 2.3 acre feet per acre, which, converted into a continuous flow, amounts to 1.49 miner's inches per acre. Exhibit 41, introduced by Oregon,

is a compilation of the data gathered upon the test farms used during the year 1933. The results set forth in this exhibit are a record of the actual application of water to lands within the Oregon area by practical, experienced farmers. Their testimony sets forth both the results of such application and the result which, in their opinion, would have followed from the application of a lesser quantity of water. Humphreys, an engineer of broad experience, testified that in connection with his investigation he made a study of the irrigation system in the State of Oregon, including the diversion works and measuring devices; that he found the diversion works and measuring devices better, on an average, than those in other districts where conditions are similar and that during the irrigation season he saw no evidence of waste of water. (Or. Abs. 90.)

S. T. HARDING, Professor of Irrigation at the University of California, was called as a witness for the State of Oregon. (Wash. Abs. 242; Or. Abs. 110). Harding is an irrigation engineer of extensive experience and broad education. He made a study of the Youngs soil map and went upon the ground and made observation of the soil for the purpose of determining its structure and water requirements. He examined the Oregon decrees as to their water allowances to the tracts used by Humphreys as test places. He made an examination of the soil, a general examination of the water supply, the reports of the stream flow and the evidence as to underground water. He observed the methods of irrigation in the State of Oregon and reviewed the testimony of the witnesses as to practice followed during the irrigation season, examined the root systems of the vegetation, the trees growing upon the ground, compared the conditions with many others with which he is familiar, and then

expressed his opinion that the practices, considering all of the local conditions, are representative of reasonable, standard practice and a reasonable use of water; that the irrigation structures in use represent the normal or usual type for conditions such as are found in the area in question. The witness took into consideration the fact that the water available for use upon the Oregon areas is the varying flow of a mountain stream and not from storage where the supply is available upon demand. He stated that the acreage which can be given full service from the direct flow of the stream is limited to the area which can be supplied during the period of maximum demand, which would be the months of July and August.

The witness stated that on most streams supplied by melting snow or ground seepage of the drained area which comes from melting snow, the maximum crop demand comes in a period of minimum stream flow. In determining the duty of water the frequency of irrigation required is of primary importance. The annual amount of water an irrigator needs is fixed by the amount with which he can cover his land at each irrigation and the frequency with which he has to irrigate. Frequency of irrigation required is ordinarily fixed by the practice and experience of those actually irrigating the crop. The land owner may not be familiar with the methods of measuring water so as to determine or know the quantity of water which he uses, but experience shows that actual irrigators can and do know the frequency with which it is necessary to irrigate for different crops, and that water requirements can be built up from that frequency and the required amount to be applied at each irrigation. (R. 1059, 1060.) The irrigator is in the best position to determine any crop injury from too long delay between irrigations and has a more constant

contact than is otherwise obtainable with the soil and crop conditions.

Harding found that the average size (7 acres) of a farm upon which the support of a family depends in Oregon is comparable to the highly developed citrus areas in California. He concluded that the amount of water allowed by the Oregon decrees, one and one-half inches per acre continuous flow, is reasonable for a larger part of the gravel cone. He testified that within that area one could probably find small areas where the land could be handled on a somewhat smaller allowance, but that such areas are so scattered and their extent is such that it is not feasible to distinguish them in the allowance of water. In conclusion he stated, as his opinion, that the maximum allowance in the Oregon decree is a measure of the requirements of the main portion of the land within the area and that a decree applying any uniform rate to a large area should have an allowance liberal enough to cover the requirement of the main portion of the coarser types of soil. (R. 1084.)

DR. WILBUR L. POWERS was called as a witness for the State of Oregon. (Or. Abs. 103.) Dr. Powers is a soil scientist connected with the State College of Oregon and during twenty-seven years has had a broad experience in soil classification, water requirement work, irrigation practice and experimental work. Dr. Powers' qualification and standing in his field cannot be questioned. He has had familiarity with the area here involved since 1914 and during two years before the trial of this case gave intensive study to the irrigation problems here under investigation. Dr. Powers' study is highly technical but detailed. He went upon the lands, dug pits, analyzed soil, examined root conditions of the plants and from such examination and his

training and experience made his deductions as to the water requirements of the soils. He used in this connection the soil map prepared by Youngs (Wash. Ex. 15), and other scientific studies. In his testimony he shows the economic effect upon commercial crops of an insufficient supply of water. After examining the soils and their water holding capacity, he concluded that the No. 3 lands, as classified on the soil map, require about five inches per application of water for proper irrigation, and that to adequately irrigate and mature crops upon such land there is required a continuous flow of 1½ miner's inches per acre during the critical months, which months are the growing period of the vegetation and, more particularly, the last forty days before the maturity of the crop. In this connection Dr. Powers found that the No. 3 lands on Mill Creek within the State of Washington should have about the same water requirement as the No. 3 lands around Milton and Freewater.

It is significant at this point to observe that notwithstanding the existence of the No. 3 lands along Mill Creek within the State of Washington the State of Washington called no practical irrigators to show that in their experience upon the Mill Creek lands a lesser quantity of water than that claimed by the State of Oregon for similar lands is sufficient for the proper irrigation and maturity of crops.

Dr. Powers admitted that 1½ miner's inches of continuous flow for the irrigation of an acre of land is an unusual amount of water, but stated that the soil here involved is also an unusual soil. He testified that this soil is unusual because of its limited usable water holding capacity; because of the fact that there is no ground water within such distance from the surface as will help meet the situation for the roots, and because of the further fact of a relatively long, hot growing season and intensive farming.

GEORGE H. CARTER of Boise, Idaho, (Wash. Abs. 247; Or. Abs. 132) a civil engineer engaged almost exclusively in irrigation engineering, testified for the State of Oregon. Since 1913, Carter has been actively engaged in the administration of large irrigation projects, stream measurement, hydrographic work, and from 1921 until 1931, was Director of Water Resource and Commissioner of Reclamation of the State of Idaho. While employed in the latter position Carter was required to study irrigation districts, water uses and to supervise about seventy-five water masters in the State of Idaho. His testimony shows that in this work he came in direct contact with the problem of the application of water to nearly every kind and character of soil. (Or. Abs. 132.) The witness pointed out the similarity of climatic and soil conditions existing in the territory in controversy in this case with conditions prevailing in the State of Idaho. He went over the Oregon area in detail. He found that the irrigation practices in the Oregon area are quite in conformity with methods and systems used in other places with which he is familiar, and that the method of distribution of water in Oregon is common and well accepted. He expressed his opinion, from his study, that the method of distribution of water, taking into consideration soil conditions, stream conditions and water supply, is an efficient distributing system under the conditions and circumstances existing. He stated, "It is a very good distribution system and conforms well to the average practice. It is possibly better than a material number of distributing systems throughout the country." He examined the data and took into consideration the claimed necessity for irrigation frequency of once a week for orchards and twice a week for tomatoes and short-rooted crops, and concluded that the amount of water applied within the State of Oregon is not

more than could reasonably be expected to keep the crops in satisfactory growing condition; that the frequency of irrigation and the irrigation practice in Oregon is a reasonable and beneficial use of water. The witness expressed the opinion that a minimum application of water in one irrigation of the lands in question is between five and six inches and that this is a minimum amount for each application under average farm conditions. Taking the minimum of five or six inches per application, the frequency of application required will determine the amount of water necessary to be applied during the irrigation season. He visited the test places and studied the record of the use of water upon these places as set forth in Oregon Exhibit No. 42. He examined the farming practices and found them good. He examined the irrigation appliances and the distribution facilities and pronounced them all that might be expected under general economic conditions and found nothing out of line with good irrigation practices. He characterized the nine test places as representative of the Oregon area and stated that the farmers upon these places were a good class of farmer. He stated in conclusion, after having found that the test farms had received an average during the irrigation season of 1933, where water was available, of 1.49 miner's inches per acre continuous flow, that he considered that delivery efficient under an attempt to deliver 1½ miner's inches per acre, and, from all the calculations and observations he was able to make, that 1½ miner's inches per acre represents the minimum amount under which these farms may successfully carry on farming in the gravel area. The witness examined the Oregon decrees and gave his opinion, that the water requirement fixed by the Oregon decree is the necessary requirement for the irrigation of the lands covered by the decree and is a reasonable requirement and

an amount of water which these farmers must have in order to pursue their farming operations successfully and profitably. (R. 1112.) The witness further testified:

"It has been my general observation with irrigation projects that the general prosperity of the project is quite largely reflected by the available water supply. In other words, you may consider any irrigation project in comparison with others and the water supply will be a very close indication or measure of that project's prosperity. Land values will diminish in proportion to the available water supply, which of course fixes the crop production, so that eventually if a water supply is spread out too thin and a man's farm is spread out over too much area and not enough production per acre he comes to the point where his taxes and his overhead and cost of farming and things of that character will exceed his return." (R. 1113, Or. Abs. 137).

"Q. Would it be feasible and practical for a stream flow as this stream is to make a limitation upon a uniform basis in acre feet for each month?

A. No, I think the limitation must be based upon the available supply in the critical months. If I understand your question, it would not be permissible nor of any value to take the stream flow for the entire irrigation period six or seven months, and average it up and say that that is the amount that could be applied beneficially each month, so that does not follow." (R. 1116.)

"Q. To what extent is that determinative of your judgment in that regard?

A. Well, the use record, in my opinion, is of considerably more value than any other information at hand. It has been my experience with irrigation farmers, where they are working under conditions of limited water supply and are attempting and succeeding in applying reasonable methods, that their conclusion or ideas as to the amount of water available during a season are the most reliable guide. I

think there is probably a tendency on one side to approach a theoretical minimum, which may be opposed on the other side by poor or haphazard irrigation farming or just use of water. The problem as I see it is to reach a reasonable meeting ground between these two extremes. At least that is the theory that I have pursued in my irrigation work.

Q. And in the fixing of your duty of water for number 3 soils in the district there, including the 2-B, at an inch and a half per acre, you feel that that is a reasonable meeting point between those two extremes for this district?

A. Yes, sir." (R. 1117-1118.)

Upon cross-examination Carter testified that the stream system here is used by a great many diversions made by the farmers without any heavy expense in canal or diversion works; that he does not believe that anything economically feasible could be done to improve the present distribution system; that it seemed to be above the average in its present state, and that it is pretty well controlled with nothing but earthen ditches.

DR. JAMES G. WOODBURN testified as an expert witness for the State of Washington. (Wash. Abs. pp. 70-154.) Dr. Woodburn is a man of broad technical education as a hydraulic engineer. He first came to the Walla Walla project in June, 1932, for the purpose of making engineering studies, and between that time and the date of his testimony spent a large amount of time in making detailed studies of stream flows, water distributions, available water supply and other related questions involved in the use and the availability for use of the waters of the Walla Walla River stream system. He testified that the Walla Walla River and Mill Creek are fed during the low water season almost entirely from ground water because of the scarcity of rain-

fall during the summer season. Both Mill Creek and the Walla Walla River flow across broad alluvial fans. Around the lower fringes of these fans, in addition to the streams themselves, there are many natural gravity springs which drain the water from the alluvial fans and turn it into the Walla Walla River. The water emerging from the Mill Creek fan comes out in such way that it can be used for irrigation only on the lower lands of the project and is not available for use upon the areas here in controversy. The water emerging from the Walla Walla River fan in Oregon can partly be used on the lands in question, but that part of the water which emerges from the fan on its western end is, like that emerging from the Mill Creek fan, too far west to be available for use. Only that part of the water coming from the springs on the eastern part of the Walla Walla River fan can be used on lands having rights on the Walla Walla River. There have always been springs around the fringes of the delta of both Mill Creek and the Walla Walla River. The flow of these springs varies directly with the flow of the Walla Walla River, which is dependent upon the precipitation in the mountains to some extent, and particularly upon the winter snowfall. Any change in the regimen of the flow of either Mill Creek or the Walla Walla River, particularly the latter, which creates less water on the eastern part of the alluvial fan and removes it to the west, diverts water past intakes in Washington which supply rights on the Walla Walla River. Walla Walla City diverts its water into a pipeline in Oregon and conducts it thence to a reservoir shown on Washington Exhibit 17, from which reservoir the water is distributed for use within the City. The unused part of said water supply is returned to Mill Creek above the mouth of Yellowhawk Creek. Dr. Woodburn described the north and south forks of the Walla

Walla River in Oregon, their course through the canyon and their emergence into the valley. He pointed out the diversions as they are taken out, beginning with the first upstream diversion, then continuing on down the stream. After a detailed description of the river system with its varying channels and capacities he took up the question of the available supply of water in the Walla Walla River during the summer or irrigation season. He found that from about the year 1903 gauging stations have been maintained on the Walla Walla River, but that because of reasons, which he stated, the dependable data are covered by the sixteen years from 1918 until 1933, which period of measurement includes variable years of high and low water flow. With these and other measurements of inflow, and measurements and computation of transportation losses, Dr. Woodburn reconstructed the river and its tributaries into an available water supply for the irrigation season for the purpose of applying such supply to the water requirements of the lands within the correlated area. He took the Oregon decrees with their designated acreages and their water allowances and testified that in the month of July, 1933, through certain ditches, there was a 25.1 per cent over-diversion, and in August, 1933, there was a 14.7 per cent over-diversion.

These over-diversions are deduced in the data set forth in Washington Ex. 30. These data are examined by Oregon in connection with decreed acreage, and allowance made for transportation loss in the natural channels through which the water is conveyed after diversion from the river.

Oregon's conclusions are set forth in Oregon Ex. 44. This compilation shows that instead of an over-diversion, as found by Dr. Woodburn, there was an under-diversion of 4.5 c. f. s. Dr. Woodburn then proceeded through the

entire irrigation system for the purpose of showing what in his opinion would be the amount of water necessary to supply the rights as fixed by the Oregon decree. Having fixed the water supply and the acreage, he proceeded to show what would happen if the Walla Walla River area, including Mill Creek, should be administered, regardless of state line, and rights closed off in their respective priorities on all streams in the related system.

Since the rate of use of water affects not only the amount of surplus, but also the extent of its distribution, the witness assumed three different rates of use in Oregon in his computations: (1) The maximum rate specified by decree, which, because of minimum amounts allowed small tracts and because of one large stock-water and domestic right, averages somewhat more than 1½ miner's inches per acre; (2) 1¼ miner's inches per acre, a rate of use amounting to 1-⅞ acre feet per acre per month, which, if applied through the two months of July and August would amount to 2/5 of the seasonal total of about 9½ acre feet per acre; (3) 1 miner's inch per acre, a rate of use amounting to 1½ acre feet per acre per month, or a total depth of water of 10½ feet if used continuously at that rate through a seven-months season. (R. 362, 363; Wash. Ex. 30; Wash. Abs. 109).

The rate of use in Washington was assumed to be one c.f.s. to one hundred acres, or .4 miner's inch per acre. The witness then took the Washington and Oregon decrees and correlated the priorities in the two states and set forth in Table 4, Exhibit 30, what would result if all Oregon rights subsequent to 1892 were closed and the surplus accruing under the different bases distributed, first, to make up the shortage in Gardena and the amount remaining to Washington and Oregon rights with priorities subsequent to 1892.

The effect of these computations is to decrease the amount of water heretofore applied in the State of Oregon, to close off all Oregon rights accruing after 1892 whenever there is not a sufficient quantity of water in the entire system to fill all Washington rights with priorities up to 1892; to add materially to the available supply for the Gardena project and to extend the period when water would be available for irrigation under priorities later than 1892.

The witness testified (Wash. Abs. 123) that there are nearly three hundred wells in the Milton-Freewater vicinity, as indicated upon Washington Exhibit No. 17. A joint survey was made by the two states in September, 1932, for the purpose of locating and obtaining measurements of the well flow, the size of pumping equipment and the size and depth of wells, and the record of electricity consumed. From such survey and data it was indicated that during the irrigation season of 1932 a total of 9,010 acre feet of water was pumped for use on the Milton-Freewater area.

In cross-examination the witness testified that he had never had charge of the distribution of water in any part of the country and had had no experience in the irrigation of lands. The witness testified (Wash. Abs. 130) that from the beginning the large amount of irrigation has been west of the Tum-a-lum River and that the development of the country to the west of that river requires the diversion of the water away from the stream. The witness, in his computaions of available water, used three typical years, the year 1931—a year of minimum flow, the year 1932—a year of less than average flow, and the year 1933—a year of slightly greater than average flow. The Tum-a-lum River, during July and August, had not been dry every time he had visited it between the Nursery Bridge and the McCoy Bridge. (Wash. Ab. 144). At times there was water

flowing for several hundred yards below the Nursery Bridge and usually there had been water for some distance above the McCoy Bridge, leaving a distance of approximately one half mile that would be dry between those bridges. In 1933, with a flow past the Nursery Bridge of 19, 21 and 25 second feet, for three succesive days, there was a space in the river channel in which there was no flow, but there was a slight rise at the state highway. The witness testified that he could not say how much water would have to be turned down at the Nursery Bridge in July of any year in order to reach the lower rights on the Walla Walla, but that 22 second feet would go through eventually. In June, 1932, while Humphrey and the witness were making a study of this area, 20 c. f. s. did not get through, but there was flow at the state line continuously. The water that was turned down at the Nursery Bridge did not get over the dry spot as a surface flow; it might have gone under it. The stream from the McCoy Bridge down is a gaining stream; that is true whether or not water is going over the spillway at the Nursery Bridge. (Wash. Abs. 144). In June, July and August the stream between the Nursery Bridge and the McCoy Bridge is not a falling stream, it has already fallen. There is no water there. The attempt to get 22 c.f.s. down the Tum-a-lum during June, July and August would to some extent be wasteful and, to the extent of the waste, would not be economical. It would not be as economical as a really good irrigation canal. (Wash. Abs. 145). The indications, from the data, are that most of that water entering the upper end of the Tum-a-lum at the Nursery Bridge would show up in the stream channel by the time the state highway bridge in Washington is reached. There may be some loss in that reach which enters the underground reservoir but it does not show gravity outlets in the Big Spring

branch or branches along the Tum-a-lum, and possibly further west in the East Prong. (Wash. Abs. 146). The theory of distribution assumed by the witness would not compel an entire change of the present Oregon method of distribution. It would involve some change and improvement. Of course, with rights subsequent to 1892, it would involve a radical change. On rights prior to 1893 it would not involve a radical change, though it might involve some change. It would not compel a complete lining of the conduit through which the water would be conducted to get it down to the lower Walla Walla without loss. Whether the witness, as an engineer, would recommend the construction of such a project, based upon the amount of information in his possession, was not a requirement. "If I were starting out with no irrigation in this valley, I would redesign the system entirely at the start because it has just grown up. Such facts as I have here I believe would warrant certain changes." (Wash. Abs. 148). The witness then took the published schedules of the companies furnishing electricity to the pumps and showed the graduated charges for power therein provided. The schedules provided for a quantity discount which the witness testified would, in his opinion, have some effect on the amount of electricity used for pumping purposes and the amount of water pumped. The computations of the witness show that the pumping of large quantities of water reduces materially the cost per acre foot pumped. (Wash. Abs. 149, 150, 151, 152).

CARL A. LARSON was called as a witness by the State of Washington (R. 896 to 912, 1174 to 1177, Wash. Abs. 154). Dr. Larson was at the time of the trial of this action with the U. S. Department of Agriculture, holding the position as agent cooperating with the Irrigation Branch Employ-

ment Station at Prosser, Washington. The witness accompanied Mr. F. S. Youngs in connection with the soil survey evidenced by the Youngs Soil Map (Wash. Ex. 15). With the Youngs Soil Map as a guide the witness made examination of the various types of soil in the area covered by the map and went to the farms and secured from the farmers information as to irrigation practice and methods. (Wash. Abs. 158). These visits were made during the fall of the year and in the main after the irrigation season. Soil samples were taken and analyzed for the purpose of determining the water holding capacity of the soil. The witness expressed the opinion that some of the irrigation furrows were entirely too long for economical irrigation, and that the water was required to run in them as much as sixty hours continuously to get to the end of the runs. There were few irrigation structures; the lands are usually irrigated out of earthen ditches without structural turnouts. There was more flume encountered in the Gardena project than elsewhere. Water saving appliances were not found in a general way in the valley. The farm products were diversified. The witness expressed the opinion that for the purpose of determining water requirements, the soils portrayed on the Youngs map should be divided into two groups: First, 1, 1-R, 1-D, 1-RA, 4, 5 and 2-A; second, 2-B and 3. The witness expressed the opinion that the first class of lands required 4.8 acre feet per irrigation season or a constant flow basis of ½ miner's inch per acre. The water requirement on the second class the witness fixed at a constant flow of one miner's inch per acre over a season of 6½ months. This amount was fixed for the purpose of taking care of the peak months and the amount of water allowed is sufficient for the period of greatest demand.

In arriving at his conclusion the witness did not con-

sider any of the use records for the particular pieces of land. With certain limitations the use which has been made of water is the important factor in determining the duty. Whether the duty of water should be fixed at an amount somewhere near what the farmers use in actual practice depends upon what you term reasonable efficiency in applying the water. In setting the duty of water you cannot disregard either the maximum production per unit of water or the minimum production per unit of land. Where a farm is being operated on a large amount of water, which gives to the farmer a maximum production of crop per acre, but the average production per acre foot of water used is low, the witness stated that he would want to know how the farmer was irrigating before suggesting a reduction in the amount of water used. (Wash. Abs. 162). In fixing the duty of water the witness testified that the expense which the irrigator has gone to is a matter for consideration. If the irrigator has used every efficient method possible and then has insufficient water, if he has gone to expense of putting in a pumping plant, it would be powerful evidence that his gravity supply was too small.

The witness admitted upon cross-examination that he had not carried on any irrigation work upon lands of the same character as the No. 3 soil in the Milton-Freewater area; that in his experience he knew of no soils just like it. (Wash. Ab. 165).

WILLIAM W. JOHNSTON, a witness for the State of Washington, testified (R. 938-988, Wash. Abs. 172-205): That he is a Reclamation Economist with the U. S. Bureau of Reclamation, Department of Interior. His duties under the Department are chiefly with the agricultural phases of the work of the Bureau, including classification of lands,

investigation of water duty, economic problems connected with the repayment of water charges and the ability of land to repay such charges. He has been with the Department in that position for eight years. He has a B. S. degree in Agriculture from the Oregon State Agricultural College. He was Field Agent of the U. S. Department of Agriculture engaged in duty of water experiments for about four months in 1917. He was a member of the faculty of the Oregon State Agricultural College from 1919 to 1925, engaged largely in soil and investigation work. His investigation locally has been for the purpose of familarizing himself with soil and agricultural conditions, with a view of determining the water requirements, largely on the basis of comparison with use in projects where he has made other investigations. He made an examination of the soils here and attempted to acquaint himself with the irrigation practices. He spot-checked the soil map (Wash. Ex. 15) in the field in certain places. He gave as his opinion that the soil classification shown on the Youngs map should be grouped as was done by the witness Larson. For the purpose of his testimony he referred to the gravel group as Group B and the balance as Group A. For Group A, he recommended a diversion duty of ½ miner's inch per acre—which, with an estimated loss in transit of fifteen per cent, would make at the land a duty for the peak month of .63 acre feet. On a constant flow basis this would give for a 6½ months irrigation season 4.81 acre feet per acre. For Group B he would allow a diversion of .9 miner's inch per acre or 1.34 acre feet as a diversion duty in the peak month, which, with a transportation loss allowance of twenty-five per cent, would give a net duty at the land of 1 acre foot per month, or 8½ acre feet per acre gross duty on a 6½ months irrigation season. The principal basis of this determination was the study made

by the witness in the Sunnyside Valley in 1930 and 1931, which study he adapted to the conditions here under consideration. He was familiar with practically all of the projects under the reclamation service. The investigation of the Sunnyside division was a determination of duty on what are known as the supplemental contract lands with an area of approximately 36,000 acres. The Sunnyside project was selected as having application here because the conditions were more nearly similar in climate, in method of delivering water; that is, they used small irrigation heads, and a large part of the soils were comparable. In the Sunnyside division there was first made a careful classification of the lands on the basis of water requirement. Test holes were put down on an average of one for every ten-acre tract. Each of the various ownerships was examined, notes were made as to the length of runs and furrows, the apparent care with which the land owner handled his water, crop appearance, whether or not there was indication of excessive use of water, and the acreage in different crops. There was then compiled a record of water use for these tracts over a period of eight years, which was considered representative. The land was then divided into five classes and a summary made as to the water actually delivered to each tract of land each year over the eight-year period. This was the basis of the recommended duties.

The first matter in making a comparison of what is found here in the Walla Walla valley with the Yakima (Sunnyside) project was to see whether the climatic conditions were sufficiently similar to warrant using the data. The normal rainfall in Walla Walla is 17.01 inches per season, in Milton it is 14.41, in Sunnyside it is 6.48. The rainfall in Sunnyside is appreciably less than in Walla Walla and Milton. From the standpoint of precipitation the Oregon area has some ad-

vantages over Sunnyside. The elevations above sea level are, Walla Walla 991 feet, Sunnyside 740 feet, Milton 1100 feet. The annual mean temperature at Walla Walla is 54.5 , Sunnyside 51.5°, Milton 53.4°; the maximum in each case being 104°. The number of rainy days, in Walla Walla is 114, Sunnyside 69 and Milton 82; clear days, Sunnyside 212, Walla Walla 115, Milton 128; the number of cloudy days is greater at Walla Walla and Milton than at Sunnyside. Any higher water requirement in the Walla Walla country brought about by the higher mean temperature would be balanced by the greater precipitation and the larger number of rainy and dark days. It is not claimed that the small amount of rainfall in the summer has an appreciable effect, but the lower transpiration and lower evaporation during rainy periods has a marked influence on irrigation requirement. The climate would indicate a lower water requirement here than at Sunnyside. The witness then proceeded (Wash. Abs. 179) to give a detailed statement of the soil classifications which he made at Sunnyside and the amount of water which was allotted to each of these classes of soil. Where there was a use of water on the Sunnyside project in excess of the allowances made by the witness, it was explained as due to causes other than the water requirement of the soil. The witness stated, (Wash. Abs. 184) that since he had been in this area only a short time he had to arrive at his conclusions regarding irrigation practice as to the No. 3 type soil largely from examining the farm irrigation systems. The irrigation practices in this locality are far behind the general agricultural practices. On very intensively cultivated small farms, you find the condition of irrigation furrows, conditions of head ditches, the method used in making furrows, of a type that you would expect where the farming was very extensive. There is one flume about one

hundred yards long near Milton, which was the only flume of that type. There were no turning-out devices from the laterals to the land for saving water. There was very little irrigation going on in the territory—about three places where he saw water being used. The irrigation runs appeared to be quite long—that is, the length of the furrow from the real head ditch until there is another head ditch. As to the practice of putting in pick-up ditches at intervening points between the place where the water is turned on the land and the lower end of the land, the more efficient practice would be to have a second head ditch so that when you were irrigating your second run of furrows, you can have the water in a single ditch. It is not good irrigation practice to have 18 to 20 rills running down to a pick-up ditch and a second line of rills approximately the same length from the pick-up ditch to the lower end of the tract on soil such as No. 3 in the Milton-Freewater territory. Short runs are to prevent over-percolation of water in the upper area of irrigation. The length of run in the vast majority of cases in the Yakima valley is 320 feet. The best practice is to clean out the ditches as soon as possible after irrigation until such time as the crop gets up to where it will shade the ground and where cultivation would break down the plants.

There is no peculiar physical condition in connection with Class 3 soil in the Milton-Freewater territory which would make the distribution of water on that land particularly difficult. The soil apparently subs quite easily. A few farmers state that it is possible to get the water through a run of 20 rods in two hours without washing. That would indicate that they can spread the water rapidly in the surface soil without much deep percolation. The allowance for the soils included within Group B is comparatively liberal when you consider the nature of agriculture. The

allowance given by me takes care of the peak requirement. It is necessary between June 15th and August 15th to have a fairly large supply of water. The allowances made are sufficient for that period. The allowance for transportation loss is liberal. Considerable improvement could be made in the reduction of transportation losses without great expense. It would be expensive to line the ditches to stop all losses, but the ditches are undercut and frequently have excessive fall and weeds have grown up along the edges. The improvements to be made depend on the intensity of the agriculture. In areas where they have large farms and per acre crop returns are low they ordinarily do not go to much expense to fix up their ditches. In areas where water is valuable and agriculture is intensive, it is customary to put in flumes. There are many things that can be done which are not expensive to save water, which could be applied. The witness stated that the use of more water than he indicated here would be more harmful than beneficial. In the shallow soils the loss in fertility from excessive irrigation is an important factor. The amount recommended is all that could be beneficially used.

The witness stated that he had the opportunity to observe considerable irrigation of stony, gravelly soil, and though he had not himself handled water on it he had conducted duty of water experiments on the kind of soil which exists around Milton. There are some small areas around Sunnyside of stony and gravelly soil, but they are not large enough to make a separate classification for them.

Dr. Powers (a witness in this case) was brought in for a few days to review the work of the witness on the Sunnyside project and to advise with him. A prior soil classification in Sunnyside was based upon a study made by Harding, a witness in this case for the State of Oregon.

The witness started his investigations of this district March 30, 1934. (Note: The witness testified April 4, 1934.) Long years of farming are necessary for the best demonstration of what amount of water is actually needed. Farmers, unless they have farmed with a limited water supply ordinarily will not adapt themselves to good irrigation methods. (Wash. Abs. 193.) The fact that a farmer is spending money for pumping water would not necessarily be proof that the total amount of water otherwise available is inadequate. A man might do that for the purpose of making a larger irrigation head instead of rotating. The expenditure of money would be a general indication of want of water. If after years of farming and experimenting with longer and shorter runs the farmers had generally used a 20-rod run, that would not be considered what would be best in those conditions if they were operating with an unlimited water supply. The witness stated that he had not been over the lands here involved during irrigation season when everyone was irrigating. All he had seen was the preparation for irrigation which was observable during the last few days. No soil tests were made other than soil examination of profile for comparative purposes. There was no determination of the soil content and water holding capacity. No laboratory tests were made. The limiting factor on the soil here is the water holding capacity, but the limiting factor on the soil at Yakima is the amount of deep percolation that is necessary in order to cover it. The latter would be of more importance in fixing the duty of water than the limited water-holding capacity of the soil. In and around Milton it would probably not be economical for the farmers there to line or flume their ditches to any extent under present conditions, with the exception of the real small, very intensively cultivated ranches. It would pay as to those to

have some sort of flume regardless of water supply. It is a general thing over the northwest in the irrigation projects for the amount of production of alfalfa to be reduced after the virgin fertility of the soil has been used. In the Yakima district orchards would be irrigated not oftener than once in two weeks, for alfalfa there would be only three or four irrigations per season, potatoes usually once a week. The fact that alfalfa is irrigated only three or four times a year would indicate a large water holding capacity in the soil. In the orchard tracts they would generally apply about six acre inches per irrigation, somewhat less on Class 4 and considerably more on Class 5. On Class 5 you necessarily lose an enormous amount of water in deep percolation. Around Milton light irrigation could be applied successfully. There would not be a big percentage of loss through deep percolation if they ran the water for a period of about three or four hours along the furrows. Many of the furrows used in the orchards have been too deep. The ditches should be kept free from weeds, not more than three or four furrows between the three rows, checks should be put in to control the grade, then there should be controlling devices. The irrigation then should proceed at a rate which would get the water down to the end of the row in a comparatively short time, if possible two hours. The witness was not familiar enough with the soil to state just what the length of time for irrigation should be, but he stated that it ought to be short enough that there would be practically no waste at the lower end. The irrigation should be completed within three or four hours; longer periods would result in excess percolation. The experience and judgment acquired by reason of long farming needs to be considered in fixing the number of applications of water. The judgment of the man upon the ground should not necessarily be relied upon.

Like areas should be compared to determine the amount of water requirement. Farmers here have stated they can run the water through on Class 3 soils for two or three hundred feet in three hours and with a large head in a shorter time. No. 3 soil in the Milton-Freewater area does not have any unusual soil percolation problems. It is undoubtedly possible by keeping the water on a long time to lose an enormous amount through deep percolation because there is nothing below to stop it. In ordinary irrigation practice it can be irrigated with very little percolation loss.

Dr. Powers, a witness for Oregon, is familiar with the Sunnyside project used by Johnston as the basis of comparison in his duty of water determinations. Powers testified that the soils in the Oregon area would certainly use more water than those of the Sunnyside project (Or. Abs. 102.)

**Evidence as to Ground Water and Use of Wells in Oregon.**

ARTHUR M. PIPER

Mr. Piper is a geologist employed by the U. S. Geological survey as a specialist in the study of ground water. Since 1926, he has been engaged largely in the study of underground water problems on behalf of the Government in the States of Pennsylvania, New Mexico, Tennessee, Oregon, Washington and California. In cooperation with the U. S. Geological Survey, Oregon Agricultural Experiment Station of Umatilla County and the Washington Department of Conservation and Development he made an investigation and study of the underground water conditions in the Walla Walla River basin. For seven years the witness was with the Idaho Bureau of Mines and Geology, spending during that period from half to two-thirds of his time upon under-

ground water problems. Oregon Exhibit No. 16 is the report of the witness upon his underground investigation of conditions involved in this action. The substance of Piper's testimony follows (Wash. Ab. 223, R. 761-804):

A bedrock underlies the basin and is the base upon which the valley is built. The outcrops extend entirely along the north, closing around the west, except a very narrow gap through which the stream escapes. It extends continuosuly along the south, but lying slightly to the east; in places the bedrock almost comes to the surface. It is folded in the form of a canoe-shaped basin, the deepest part of which is between Touchet and Lowden about on the the state line and there the dense bedrock is first reached somewhat below sea level and several hundred feet below the land's surface. From this point the bedrock rises in all directions. Within the depression of the bedrock there are various deposits laid down by streams, which make up the valley. The oldest of those stream-laid deposits is the Gardena terrace. In the vicinity of Gardena the terrace is approximately 120 feet above the flood plane of the Walla Walla River. (Wash. Ex. 17.) To the eastward the height of the terrace decreases until opposite Milton it is perhaps 40 feet. Still further east and northward toward Walla Walla and east of Walla Walla and around Milton it comes down nearly to the level of the flood plane. Initially this terrace covered the entire basin. It comprises two fans in form, with the center about the present canyon of the Walla Walla River at Milton and Freewater. Another one has its head near the village of Tracy. These two fans declining to the westward merge together in a rather flat, smooth plane. The two fans join about where the Yellowhawk flows in to the Walla Walla River. Portions of the plane that are exposed are composed of relatively fine stratified material. This material is well exposed near

the head box of the siphon crossing Pine Creek on the Burlingame (Gardena) ditch. The material is relatively fine, rather tight and would not transmit water rapidly. After the formation of the Gardena plane the streams have cut into it and formed the channels through which they now flow. In the vicinity of Milton and Freewater and around the City of Walla Walla the streams have almost completely cut away the top of the old terrace. Later they began to deposit gravel in the valleys which they had previously cut out. That process has resulted in two formations, one termed the "low terrace," designated upon the report (Or. Ex. 16) in brownish yellow. Those terraces extend but little above the flood plane, commonly not more than five or ten feet and nowhere more than twenty. They are formed of fine material, relatively water tight. The other, the youngest formation in the basin, is the coarse gravel, forming the fans at the mouth of the canyons of the Walla Walla River and of Mill Creek, one extending outward as a tongue or finger along each of the streams, much like the pattern of one's hand and separated in places by the remnants of the high terrace. As these fans extend they become progressively finer, as is the normal condition of a deposition by streams. The records of a number of drilled wells given in the report show the total thickness of the material resting on bedrock as approximately 350 to 550 feet. The widest opening of the gravel fan that goes north from Milton and Freewater is near the eastern side of the fan, now occupied by the Little Walla Walla River.

In developing the study of ground waters the method recognized by the Geological Survey was used. A reasonable number of representative wells were selected and in those wells periodic measurements were made to determine the static level of the ground water and from those measurements

the fluctuations of that level were traced. The purpose was to relate those fluctuations to the source and disposal of the ground water. The grade or slope of the surface of the country are only incidentally considered. The measurements are reduced to height above sea level and the form, not of the land surface, but of the water table is dealt with. Around Milton and Freewater and north therefrom the grade of the land surface is approximately 80 feet to the mile, being steeper close to Milton and becoming gradually flatter as one goes outward. Wells were selected which are representative of the natural range in conditions, using both deep and shallow wells for observation. The observation wells were selected to cover the entire district northward of Mill Creek, as designated upon Oregon Exhibit 16, Plat No. 5. Plat No. 5 shows the form of the water table at two periods, one approximately June 20, 1933, and the other approximately August 29, 1933. The first period is that when the wells stood at their highest level for the season and the later period, August 29th, when they were at about their lowest point for the season. The lines upon the plat are drawn to represent 50-foot levels, one line, solid, showing the contour at the June 20th period, and a broken line showing the contour at the August period. The lines are so drawn as to divide areas in which the water table has fallen or risen in equal amount. Colors are used on the plat to show areas on equal rise and fall. The absence of color indicates that the table fell less than five feet during the period. The areas shaded in the lightest pink tone indicate that the fall of the water was between five and ten feet. The next darker shading indicates a fall between 10 and 15 feet, and the darkest shading a fall of more than 25 feet. The blue shading shows where the water level rose. In none of these was the rise as much as 5 feet. The water in the gravel

would move or percolate exactly as though it were surface water flowing down hill and at right angles to the contour lines. Where the gravel is of even texture the rate of movement is proportionate to the grade, or inversely proportional to the spacing between the contours. The June 20th contours represent a period when the high water is flowing down the Tum-a-lum River in Oregon so that there is water flowing on the surface of the stream bed through its entire length. At that time the contours of the Milton-Freewater fan are roughly circular, apexing near Milton. The water table rose both from the east and the west in that district and was highest at the Tum-a-lum fork. The observation of wells which were measured frequently near the river indicates that they rose and fell in a pattern entirely similar to the rise and fall of the stream. The water which would seep away from the river and become ground water high on the fan could percolate rapidly outward directly down the slope over practically the entire width of the fan in a conical form. Water which left the river high on the fan in the vicinity of Milton and Freewater, if it percolated rapidly outward, would pass along the westmost edge of the fan, some of it nearly northward. If some of the water left the stream bed of the Tum-a-lum at a point approximately half way between the Nursery Bridge and the McCoy Bridge it would be more constrained as to the area within which it could percolate. It would be bounded by radii drawn from the SW¼ of the NW¼ of Section 14 and would extend westward nearly to the west fork of the Little Walla Walla River. Seepage water entering the formation near the Nursery Bridge would supply water roughly for the west Little Walla Walla. 115 wells were used in the observation; they would be representative of the 300 wells within the district. The area where the wells are operated

shows the greatest fluctuations of the water table for the August 29th measurements; but it shows a change of grade but no departure from the general conical shape that existed before the decline. It cannot be assumed that the variation is caused by pumping. In the higher part of the fan about Milton and Freewater and extending northward and westward to about the 800-foot contour line on plat 5 of Oregon Exhibit 16, several of the observation wells close to the river have fluctuated as much as 28 feet. They would be represented by a well in the deep pink spot. If the fluctuations were caused entirely or largely by pumping, the recovery should largely wipe out that decline after pumping stops. It does not. Another thing, it is not the time of the year when those wells stand at their lowest. A few key observation wells were selected in the winter of 1932, in December, on which were installed float gauges so that the owner could read them readily. There are a number of other readings, taken every day or two to every week or ten days in December, 1932. In several of those the lowest point of the water table is not late in August, not late in the period of pumping as is represented here, but in the preceding February and March, when there was little irrigation and no pumping. From that low period in February and March the wells began to rise and they rose after the freshets came down the river. The wells nearest the river rose to their highest point not long after the freshet was at its highest. They began to drop before pumping started. In considerable part, the ground water supply is similar to the surface water supply and comes down in a current or freshet, rising and falling with the high water and low water seasons of the year. It is rather a wave. Observations have shown that the water table rises in some wells in response to the river and in response to the irrigation

nearby; that is, the spreading of water over crop land near the well, and in response to rainfall. The water table falls after pumping becomes general or as the river declines. The natural regimen of the basin is such that more than one of the agencies causing the water table to fluctuate will be active at the same time. It is impossible to say what fraction of the total rise is due to the river and what to irrigation. Conversely the pumps are turned on as the supply of water for surface irrigation declines, which is also as the river declines, so that the depression of the water table due to pumping in 1933 began soon after the water table had begun to decline because the freshets had passed down the river. The data do not justify an estimate of the portion of the total fluctuations due to the several causes. The greater part of the fluctuation is related to changes in discharge of the river. The depressions in the water table as shown north and northwest of Freewater do not destroy the general conical form of the water table or greatly disturb the general direction of percolation. There is a slight indication, not strong, which represents conditions of one year only, that in the eastern edge of the fan there was relatively more steepening than in the western part of the fan. There is a suggestion from the evidence that this would tend to divert more water to the east side of the fan and relatively more water to flow northward than to the westward. Along the higher part of the fan the percolation of the ground water is unrestricted by the remnants of the Gardena terrace, but as we pass outward, the alluvial gravel separates into these several fingers which pass between and rest on a floor of the material forming the Gardena terrace. In other words the gravel which relatively is highly permeable is breaking up into tongues which are separated by relatively impermeable ma-

terial. Those tongues rest on a floor of some more impermeable material which from below is constricting the thickness of the young gravel. The net effect is to reduce greatly the area of cross-section in that gravel through which the ground water can move freely, that is, about three miles northward and westward from Milton along the eastern tips of the Gardena terrace. There is perhaps about four miles of width in that gravel through which the ground water can percolate. A mile further out that width is reduced, perhaps half, the greatest constriction being toward the west. Just at Milton and Freewater the contours indicate a dispersion of water away from the stream. The eighth contour and the lower contours have a similar form in that they trend somewhat west of north to the north of the Walla Walla River, but after they cross the river swerve sharply toward the west and southwest. If water is moving down the slopes it converges toward the river both from the north and from the south along both sides of the V-shaped valley. From the 950 contour to the 800 contour it would indicate a losing stream. From the 800-foot contour the water table slopes toward the stream from both sides so the water moving inward to the river would tend to make a gain. On Exhibit 16 we list the springs and classify them in three zones—the so-called inner zone, which contains most of the springs and which is roughly between the 800-foot and the 850-foot contours, as shown on Plat 5, Oregon Exhibit 16; beyond that is the intermediate zone between the 700 and 750-foot contours in which there are fewer springs; and the outer zone which is between the 600 and 650-foot contour. Most of the springs are in the higher zone. This indicates that the surface grade is such as to overtake the water grade. The first row of springs is within a zone beginning about where the McCoy Bridge is located on the

Tum-a-lum River. The application of irrigation water is rather general over the whole fan. The data do not permit saying what portion of the total fluctuations of the water table is due to irrigation, although some of it undoubtedly is. It has not been possible from the data available to show that the form of the water table in any major feature is the result of irrigation or is the result of pumping. The general pattern of ground water circulation is a natural one, modified somewhat, perhaps, by irrigation water and by pumping, but not to a major extent. (Or. Abs. 74, 75.)

The sources of water supply here are just the drainage area in the Walla Walla valley. The springs that break out in the area beginning about three miles north of Freewater and extending on down to the state line and along the Walla Walla River are supplied by ground water. The lower Tum-a-lum or Walla Walla River is, when the channel is dry above, analogous to a spring. The ultimate source of the stream flow of the branches from the springs to the north of Freewater and in the Walla Walla River in the vicinity of the interstate line is the water from the drainage of the north and south forks and the small tributaries of the Walla Walla River.

The evidence shows without contradiction that the water pumped from the wells is used exclusively upon the tract of land on which the well is located. If the Washington contention that the water pumped is, in part at least, water diverted from the river and applied to the lands and lost in deep percolation, then the user of the land would have the right to recapture the water and beneficially reuse it.

This court in the case of *Ide* v. *United States*, 263 U. S. 497, 506, quotes with approval the language of Judge Dietrich in United States v. Haga, 276 Fed. 41, 43, as follows:

> "One who, by the expenditure of money and labor, diverts appropriable water from a stream, and thus makes it available for fruitful purposes, is entitled to its exclusive control so long as he is able and willing to apply it to beneficial uses, and such right extends to what is commonly known as wastage from surface run-off and deep percolation, necessarily incident to practical irrigation. Considerations of both public policy and natural justice strongly support such a rule. Nor is it essential to his control that the appropriator maintain continuous actual possession of such water. So long as he does not abandon it or forfeit it by failure to use, he may assert his rights. It is not necessary that he confine it upon his own land or convey it in an artificial conduit. It is requisite, of course, that he be able to identify it; but, subject to that limitation, he may conduct it through natural channels and may even commingle it or suffer it to commingle with other waters. In short, the rights of an appropriator in these respects are not affected by the fact that the water has once been used."

## SUMMARY OF FINDINGS OF FACTS

From the foregoing facts I find as follows:

1. The Walla Walla River is a non-navigable interstate stream flowing through both the States of Washington and Oregon.

2. The waters of the Walla Walla River and all of its tributaries are usable and at the time of the commencement of this suit were used during the irrigation season for irrigation purposes in either the State of Washington or the State of Oregon.

3. The irrigators within the two states claim the right to the use of waters of the Walla Walla River and its tributaries under the law of appropriation and not as riparian owners.

4. Mill Creek arises in Oregon, enters Washington, and follows for a distance of twenty miles in Washington before it joins the main stream of the Walla Walla River. All of the waters of Mill Creek and its tributaries at the time of the bringing of this action had long been appropriated and used for agricultural, municipal and domestic purposes within the State of Washington.

5. The North and South forks of the Walla Walla River rise in Oregon, have their juncture in Oregon and thereafter flow northward as the Walla Walla River for a distance of about five miles to a point about five miles south of the Washington-Oregon state line, where the river divides into the Little Walla Walla and the Tum-a-lum Rivers (Wash. Ex. 17). When the Tum-a-lum River enters Washington it is thereafter called the Walla Walla River. Irrigators in Oregon have, during the irrigation season, for more than fifty years prior to the beginning of this action diverted all of the waters of the Walla Walla River in Oregon away from the channel of the Tum-a-lum River, and used the same for agricultural, power, municipal and domestic purposes.

6. The aridity of the climate is such in much of the Walla Walla River area that irrigation is necessary to agriculture. Where water is available the soil produces abundantly.

7. As a result of the use of the waters of the Walla Walla River and its tributaries, and dependent upon such use, there have been developed in each state farms, cities

and industries. Such development has been a natural, normal development and in no way affected by state lines.

8. In addition to the surface water available for use within the State of Oregon, the farmers have tapped the subsurface water supply by sinking about three hundred wells, from which wells they pump each year approximately 9000 acre feet of water. The water so pumped is used upon the lands where the several wells are located.

There is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington.

9. In each state separate adjudications have been had fixing the rights of the parties to said suits to the use of the waters of the river. Such adjudications fix the priorities as between the parties and limit the amount of use. Washington users are not parties to the Oregon adjudications and Oregon users are not parties to the Washington adjudications. The uses in each state are established uses and do not involve new irrigation projects.

10. At the margin of the alluvial fan formed at the mouth of the canyon down which the Walla Walla River flows is an area which produces small streams having their source in springs. These springs come from the underground water produced by winter snows, and from irrigation of the higher lands on the fan. The waters from these small spring branches have, for a very long period, been used, where available, for the irrigation of Oregon lands.

11. The allegation of the complaint that the use of the waters of the Walla Walla River in Oregon moves the underground water supply so far to the west that it does not return to the river at such point as to be usable within the

State of Washington is not sustained by the evidence. On the contrary, the evidence tends to show that the use of water for irrigation within the State of Oregon is beneficial to irrigators within the State of Washington.

12. In 1891 and 1892 the predecessors in interest of the Gardena Farms District filed their notices of intention to appropriate water from the Walla Walla River. For many years prior to the posting of such notices the irrigators within the State of Oregon had been using, during the irrigation season, all of the waters of the Walla Walla River arising above the Red Bridge.

The Gardena right is the largest diversion from the Walla Walla River in Washington.

Under the Gardena filings, canals and other diversion and transportation facilities were constructed at a cost of $227,000.00. In 1927 the Superior Court of Walla Walla County, Washington, decreed to the Gardena Farms District the qualified right to the use of sufficient water, as fixed in the decree, to irrigate 5000 acres of land and the further right to perfect the appropriation of sufficient additional water to irrigate 2000 acres of land. This right, except as to certain specified subsequent rights, was given a priority of 1892. In addition to the above right the Gardena Farms District was given the right to the use of fifty c. f. s. of water for winter irrigation. Winter irrigation is resorted to for the purpose of supplementing inadequate summer irrigation rights.

From the beginning the Gardena project had an inadequate supply of water for the summer irrigation of the lands lying under its canal. To overcome this water shortage the owners of this right had spent large sums of money to develop wells and reservoir sites, to use the sewage water

from the city of Walla Walla, and, as to a part of the lands, had resorted to winter irrigation. The entire development of the Gardena project had been without the use, during the irrigation season, of any waters of the Walla Walla River arising above the Red Bridge. Where there is water in Oregon in excess of the requirements of the Oregon users, there is normally an excess in Washington over the amount necessary to supply rights with priorities senior to the Gardena right. There is no satisfactory proof that to turn down water past the Red Bridge in Oregon during the period of water shortage would be materially more advantageous to Washington users than to permit such water to be applied to surface irrigation in Oregon. The channel of the Tum-a-lum River between the Nursery Bridge and the McCoy Bridge is an extremely wasteful channel. Water turned past the Red Bridge sinks and becomes part of the underground waters. A substantial part of the water applied to irrigation in Oregon likewise goes into the underground water supply.

During the period from 1892 to 1930 the Gardena users did not have the use of any water of the Walla Walla River during the irrigation season arising above the Red Bridge. They did nothing to indicate a claim to any of such water. On the other hand, with knowledge of the fact, they permitted the Oregon users to develop their communities in reliance upon the right to the use of the water.

To limit the long established use in Oregon would materially injure Oregon users without a compensating benefit to Washington users.

13. The use of water by the Irrigators within the State of Oregon is not unduly wasteful but is, under the circumstances, a reasonable, beneficial and necessary use.

14. The users within the State of Oregon have not diverted or used water in excess of their necessities or in excess of the amounts decreed to them under the Oregon decrees.

15. The present use of the waters of the Walla Walla River in the two states has grown up normally as the economical division and distribution of such water on lands upon which the water can be most advantageously used and is, as between the two states, an equitable division and distribution of the waters of the Walla Walla River.

## LEGAL CONCLUSIONS

From the foregoing facts I make the following Conclusions of Law:

1. This court has jurisdiction of this controversy as a controversy between two states to determine the rights of the parties to the use of the waters of an interstate stream.

2. The Gardena Farms District is not entitled to the use, during the irrigation season, of any of the water of the Walla Walla River arising above the Red Bridge, because:

(a) Since 1880 all of the waters of the Walla Walla River arising above the Red Bridge have been diverted and used within the State of Oregon with the knowledge and without protest until 1930 upon the part of Washington users.

(b) None of the waters of the Walla Walla River arising above the Red Bridge have ever been put to a beneficial use during the irrigation season under the Gardena filing.

(c) If the predecessors in interest of the Gardena Farms District ever had any intention to ap-

propriate water of the Walla Walla River arising above the Red Bridge such intention was abandoned before the commencement of this action.

(d) Over a period of nearly forty years the Gardena Farms District have recognized the right of Oregon appropriators to the use during the irrigation season, of all of the waters of the Walla Walla River arising above the Red Bridge.

3. The State of Oregon and its appropriators are not diverting and using more of the waters of the Walla Walla River than their equitable proportion thereof.

## RECOMMENDATIONS FOR A DECREE

I recommend that a decree be entered dismissing complainant's bill of complaint.

Respectfully submitted,

WILLIAM W. RAY,
*Special Master.*

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FILED
NOV 20 1935
CHARLES ELMORE CROPLEY
CLERK

IN THE

# SUPREME COURT

OF THE

## UNITED STATES

IN EQUITY

No. 11 Original

OCTOBER TERM, 1935

THE STATE OF WASHINGTON,
*Complainant.*

v.

THE STATE OF OREGON, *Defendant.*

## MOTION FOR LEAVE TO FILE COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

G. W. HAMILTON,
*Attorney General.*

GEO. G. HANNAN,
*Assistant Attorney General.*

FRED J. CUNNINGHAM,
*Special Counsel.*

*Counsel for Complainant,*
*State of Washington.*

STATE PRINTING PLANT, OLYMPIA, WASH.

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*Attorney General,*

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*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant,*
*State of Washington.*

The State of Washington, by its Attorney General appearing in that behalf and with the authority, consent and direction of the Governor of said state, comes now here and presents this its motion for leave to file in this Court and cause its exceptions to the report of the Special Master, which said exceptions, it is proposed, will be argued orally, as heretofore authorized by order of this Court.

A true copy of said exceptions is hereto attached.

STATE OF WASHINGTON, *Complainant,*

By G. W. HAMILTON,
*Its Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant,*
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## COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

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**(Unless otherwise indicated, the page numbers herein refer to the Special Master's Report)**

Now comes the State of Washington, complainant in the above entitled action and excepts to the Report of Honorable William W. Ray, Special Master, heretofore filed herein and for causes of exception shows the following:

## I.

### As to Findings of Fact

1. That said report passes over and fails fully to consider physical conditions of the stream system which the record shows have an important bearing on the issues and should be fully considered by the Court in determining the case, in that said report (1) assumes that the summer flow of the Walla Walla River is sporadic and unreliable (page 53) when the record shows that said flow is reasonably certain and constant; (2) assumes that the landowners of Oregon have continuously diverted during the summer all the waters of the main stream at the Red Bridge and used the same beneficially since 1880 (page 54) when the record shows that to have done so in 1880, the land then under irrigation would have had to have used from 8 to 13 acre feet per month, an amount of water which is far in excess of any allowance known to modern irrigation practice; (3) assumes that because about a mile of the channel surface of a section of the main stream (Tum-a-lum section extending from 3 to 4 miles above the state line in Oregon) becomes dry when diversions are made above, no water is running down the stream (pages 53-54) when the record shows there is a continuous subsurface flow at all times; (4) assumes that the main flood channel of the river is

the only natural channel through which water runs in the stream system down to the State of Washington (page 58) when the record shows that there are other natural channels through which water may continually flow from the State of Oregon down to the State of Washington; (5) assumes that the supply of water of the Mill Creek watershed of the Walla Walla river to which Washington has exclusive access for practicable beneficial use constitutes Washington's equitable portion of the summer waters of the Walla Walla River stream system, when the record shows that the flow of the Mill Creek branch constitutes only about one-fourth of the available flow of the river system; (6) assumes that the large use of old abandoned stream channels on the alluvial fan for distribution of water in Oregon constitutes an economical system of water distribution, when the record shows that approximately 30% of the water diverted from the river is lost in these channels; (7) assumes that the maximum per acre award of water in the general decree of the Oregon Court (Wash. Ex. No. 1) shows the proper water requirement for Oregon lands, fails to give proper consideration to the limitation in said decree that in no case shall the amount of water used exceed the amount reasonably required for beneficial use (page 76) when the record shows that the standard amount fixed by the State Engineer in all water permits for use of water in this vicinity is only 33⅓ per cent of the normal allowance in said decree, while for many small tracts of less than one acre in area, water is awarded by said decree at varying higher rates up to as high as 10 miner's inches per acre; (8) disregards the existence of waste water from the channels and ditches

in Oregon sufficient to irrigate, irrespective of priority and which is used to irrigate annually approximately 700 acres of land, as having any evidential bearing on the waste of water in Oregon, when the record shows that such water, in most instances, arises from careless and excessive use; (9) disregards the existence of over 300 wells situated in and used for the irrigation of lands in the contested area in Oregon (page 108) when the record shows that the unregulated use of these wells for irrigation in Oregon tends to deplete the hydraulic head of the river system and lessens the supply of water available for use in the State of Washington; (10) disregards the character of the stream flow which varies from year to year and affords more than average quantities of water longer into the summer in some seasons and earlier in the fall in some seasons, and assumes that Oregon is entitled to all the water of the stream including all excess water during the entire irrigation season regardless of the stream supply, when the record shows that during the irrigation season in each year water has always run in the natural stream system from Oregon to Washington and has been utilized from early times and is now used by Washington water users; (11) disregards the necessary drainage flow of the river in concluding that the stream system in Oregon has become a separate system not connected with the river system in Washington during the summer season, when the record shows that there is no possible escape of the drainage of the river system in Oregon except down to and through the river system in Washington; (12) disregards the correlated water supply of the various distributaries of the

Walla Walla River in Oregon, including the Little Walla Walla, Crockett, Ford and Spring Branches, when the record shows that they are as much a fundamental part of the stream system as the main stream in that state.

2. That said report does not properly present the evidence or conclusions therefrom in that said report (1) states that "Without protest, so far as the record shows, the City of Walla Walla, Washington, went into the State of Oregon at the headwaters of Mill Creek, a tributary of the Walla Walla River, and secured for itself a dependable supply of water for domestic and culinary uses. While this water right is not in controversy, the fact of its development and use indicates that the State of Oregon had permitted water from the available supply to be taken, appropriated and used exclusively within the State of Washington" (page 52), when the record shows that because of physical conditions there is no feasible beneficial use of which the State of Oregon can make of the water of Mill Creek and the permission to use this water which Oregon has given Washington is not strictly speaking voluntary but one of necessity; (2) states that "An agricultural community cannot develop and maintain itself on sporadic supplies of water" (page 53), when the record shows that the summer low water flow of the Walla Walla River is fairly certain and constant; (3) states that "In this connection it is further significant that during the period of high water the Washington users do not need to impinge upon the Oregon users" (page 63), when the record shows that the use of water during the period of high water when the supply is more than ample for all uses in both states

is not in controversy; (4) states "That in 1920 a headgate was constructed in the channel of the Tum-a-lum River under the direction of Carl Hartvedt, Superintendent of the Gardena project, which headgate was designed to divert the waters of the Tum-a-lum River into the Hudson Bay Canal. This of course was ample notice of the intention of the Hudson Bay Company to take the water and that it was taken with the knowledge and consent of the Walla Walla Irrigation Company" (pages 63-64), when the record shows that the controlling interest in the two companies in question had common ownership, that the two companies had common management, and that the arrangements at that time between them for the use of water was mutual, and that they were using their respective irrigation works for winter irrigation as well as for summer irrigation so long as water was available; (5) states that "When on April 23, 1930, the first of the above telegrams" (Telegrams between State Engineers, Wash. Exs. Nos. 24, 25 and 26) "was sent, the Gardena Canal had been receiving since April 1, 116 c.f.s. of water under a decree allowing it but 66.67 c. f. s. during this period, and on April 22nd, the day before that telegram was sent, the amount of water the Gardena Canal was receiving had been reduced to 68 c. f. s., an amount still near its decreed right. (Barney, Wash. Abs. 39, Wash. Ex. No. 18, p. 21) In 1930 the Washington water master, Barney, did not begin to regulate Washington users until June 10th and did not close all rights with priorities subsequent to 1892 until July 6th" (page 66), when the record shows that it is the practice in both states to encourage early irrigation when water is plentiful to store water in the soil and to relieve to some extent

the critical period of low water and that the relation of the stream branches in Washington and the relative priorities of rights thereon are such that the later regulation of them does not in itself indicate that the State of Washington was not at that time deprived of water, to which it was entitled, from the State of Oregon; (6) states (referring to the attempts of the manager of the Gardena project to secure the sewerage supply of the City of Walla Walla and to secure additional water by sinking wells) that "This conduct seems entirely inconsistent with the present claim made by the plaintiff state" (page 69), when the record shows that during the period these attempts were being made, the supply of the main stream from Oregon available for the Gardena intake was greater than it has been in more recent years because of the extended use of water in Oregon in the later period; (7) states that "During the period after the recession of the high waters in the tributaries of the Walla Walla River, none of the waters arising above the Red Bridge were ever applied to a beneficial use within the State of Washington" (page 72) when the record indicates that there is a subsurface flow in the channel of the river from Oregon into Washington; (8) states (Referring to the opinion in the case of *U. S. v. Haga*, 276 Fed. 41, written by Judge Dietrich, wherein it was held that upper water users on a stream which disappears should not be shut off for lower users on the reappearing water section of the stream where the upper stream makes no contribution during the irrigation season to the reappearing section of the stream) that "The Washington Court in fixing the limitations upon the Gardena right must have proceeded upon the same theory as that adopted by

Judge Dietrich. It will be observed in the decree that the Gardena right is given a priority of 1892, except that certain users with priorities subsequent to 1892 were made prior in right to the Gardena right" (page 73), when the record shows that this limitation was necessary because of the recognition in some of the existing decrees of the dual system of rights in the State of Washington whereby riparian rights, as well as rights by appropriation, had to be reconciled so far as possible in the general decree (Wash. Ex. No. 11) adjudicating the rights on the Walla Walla River in Washington; (9) states that "The record in this case is without dispute that from 1892 until the date of the trial of this case, those claiming the right to irrigate the Gardena tract have not applied any of the waters of the Walla Walla River arising above the Red Bridge, during the low water period, to the irrigation of their lands, and that during the high water season their rights have been adequately supplied by the Washington tributaries" (pages 73-74), when the Hydrographic Data (Wash. Ex. No. 18) submitted in evidence before the Special Master shows that a substantial source of the water diverted by the Gardena Canal during part of the low water period, as well as during the high water season, has been from the main stream of the Walla Walla River coming down from Oregon. The principal tributary of the stream in Washington, Mill Creek, enters the stream below the Gardena intake. The only other Washington tributary contributing any substantial amount of water is Yellowhawk Creek (a distributary of Mill Creek) which has not sufficient capacity to satisfy the Gardena appropriation; (10) states that "The Wash-

ington Court found in 1928 in the *Achermann* case, in which case the Washington rights to the use of the waters of the Walla Walla River were adjudicated, that the use of water on the Oregon side is a benefit and not a detriment to Washington users (Wash. Ex. 11, p. 4 of Referee's Report)" (page 74), when the language of the said referee as quoted by the Special Master is that the *early* use of such water when the supply is usually *abundant* serves a double purpose, etc.; (11) states that "In order to so apply the doctrine of abandonment it would be necessary first to find that the appropriators in 1901 and 1902, when they posted their notices of intention, and thereafter while they were constructing their canals, had the purpose to take and use the water then being diverted in Oregon and, under the law and with due diligence to apply the same to beneficial use within the State of Washington. Such intention is not shown by the evidence or the conduct of the claimants" (page 75), when the declaration in the notice of appropriation (Stipulation No. 5) states that the appropriators intended to appropriate the waters of the Walla Walla River without any exception as to the river and its tributaries in Oregon and when the record shows that until 1928 when the relative rights on the river and its tributaries in Washington were finally adjudicated, the waters of such tributaries were not definitely known or regulated so as to furnish any substantial amount of water from these tributaries in Washington to the main stream above the Gardena intake, and the principal supply of water in the main stream for the use of the Gardena project came from the river system in Oregon; (12) states that "It is significant at this point to observe

that notwithstanding the existence of the No. 3 lands along Mill Creek within the State of Washington the State of Washington called no practical irrigators to show that in their experience upon the Mill Creek lands a lesser quantity of water than that claimed by the State of Oregon for similar lands is sufficient for the proper irrigation and maturity of crops'' (page 80) when the record shows that the No. 3 soil area along Mill Creek above the City of Walla Walla and along said creek and along Stone Creek below and southwest of said city, are extensively cultivated on the high duty of water (.4 miner's inch per acre) provided for in the Washington decree (Wash. Ex. No. 11); (13) states that ''The evidence shows without contradiction that the water pumped from the wells is used exclusively upon the tract of land on which the well is located. If the Washington contention that the water pumped is, in part at least, water diverted from the river and applied to the lands and lost in deep percolation, then the user of the land would have the right to recapture the water and beneficially reuse it'' (page 108), when the record shows that in many instances the landowner is using water from his well for irrigation when the priority of his right on the stream is in the class of later rights not entitled to use at that time and which is shut off. The rule of recapture does not advance the priority of the water user's right.

3. That said report is incomplete in that it fails to present for the consideration of the Court (1) the review of any evidence or a summary thereof concerning the use of water from the branches of the river above the gap in the canyon at Milton where no regulation of the

use of water is had or attempted; (2) the review of any evidence or a summary thereof concerning the diversion of water for the Milton ditch where water is diverted from the river through old river channels and measured at a point about a mile from the diversion point and the amount diverted is so excessive as to furnish at the end of the ditch water for irrigation of a considerable acreage of land having no legal rights to water from the river; (3) the review of any evidence or a summary thereof submitted by Washington witnesses tending to prove that the summer supply of water in the main stream of the Walla Walla River in Washington has been diminished in recent years by the increased use of water for irrigation in Oregon; (4) the review of any evidence or a summary thereof submitted by Washington witnesses tending to show that prior to the final adjudication of the relative rights on the tributaries of the Walla Walla River in Washington in 1928 and the later regulation thereof, the waters of these tributaries were all used by the water users along the tributaries and said tributaries contributed little water during the summer season to the main stream for use of the Gardena project, the water for which during the early period of its development came almost exclusively through the main stream from Oregon.

4. That said report fails to give full consideration to the agreement of the two states as to the rights, as between the parties to this cause, on Mud Creek and its tributaries and on Pine Creek and its tributaries set forth in Stipulation No. 2 wherein it is provided that the rights on these streams are hereby established, and shall be administered, and the water shall be distributed to

such rights, in accordance with the decrees of the courts of the two states and the permits for the appropriation of water issued by authority of the two states, in the same manner as if the State line did not exist, and there are no issues herein in respect thereto, in that it recommends a dismissal of the action without giving effect to this agreement.

5. That said report erroneously states the law relative to appropriation in the State of Washington in that it states that the law controlling the appropriation of waters in force in 1891 is a certain statute, part of which is quoted on page 67 of said report. But said report fails to state that said statute is not exclusive and that rights by appropriation may be initiated and consummated in the State of Washington irrespective of and without compliance with such statute.

6. That said report (pages 59-75) erroneously considers, discusses and passes upon evidence concerning the initiation and development of the Gardena water right, which evidence was submitted over the valid and timely objection of the State of Washington, that such evidence was not material or relevant to the issues involved in the case for the reason that under the facts and the laws of Congress, the State of Oregon cannot in this controversy question the validity of the Gardena appropriation or its priority date. (Wash. Abs. 258)

7. That the following findings in the summary of the findings contained in said report are hereby excepted to for reasons heretofore mentioned herein, as not sustained by the law or the evidence:

(1) The following in Finding No. 5 (Page 110): "When the Tum-a-lum River enters Washington it is thereafter called the Walla Walla River. Irrigators in Oregon have, during the irrigation season, for more than fifty years prior to the beginning of this action diverted all of the waters of the Walla Walla River in Oregon away from the channel of the Tum-a-lum River, and used the same for agricultural, power, municipal and domestic purposes."

(2) The following in Finding No. 8 (Page 111): "There is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington."

(3) Finding No. 11. (Page 111)

(4) The following in Finding No. 12 (Page 112): "The entire development of the Gardena project had been without the use, during the irrigation season, of any waters of the Walla Walla River arising above the Red Bridge. Where there is water in Oregon in excess of the requirements of the Oregon users, there is normally an excess in Washington over the amount necessary to supply rights with priorities senior to the Gardena right. There is no satisfactory proof that to turn down water past the Red Bridge in Oregon during the period of water shortage would be materially more advantageous to Washington users than to permit such water to be applied to surface irrigation in Oregon. The channel of the Tum-a-lum River between the Nursery Bridge and the McCoy Bridge is an extremely wasteful channel. Water turned past the Red Bridge sinks and becomes part of the underground waters. A substantial part of

the water applied to irrigation in Oregon likewise goes into the underground water supply. During the period from 1892 to 1930 the Gardena users did not have the use of any water of the Walla Walla River during the irrigation season arising above the Red Bridge. They did nothing to indicate a claim to any of such water. On the other hand, with knowledge of the fact, they permitted the Oregon users to develop their communities in reliance upon the right to the use of the water. To limit the long established use in Oregon would materially injure Oregon users without a compensating benefit to Washington users."

(5) Finding No. 13. (Page 113)

(6) Finding No. 14. (Page 114)

(7) Finding No. 15. (Page 114)

II.

As to Legal Conclusions

And the complainant excepts to the Special Master's conclusions of law in that:

1. Conclusion No. 2 (Page 114) and subparagraphs (a), (b), (c) and (d) thereof are not sustained by sufficient evidence and are contrary to law for reasons heretofore specified under exceptions to the Master's Findings.

2. Conclusion No. 3 (Page 115) is not sustained by sufficient evidence and is contrary to law in that

(1) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and impliedly approves the diverting, the permitting of the use of, and the apportion-

ing and distributing of, water by the State of Oregon from the Walla Walla River and its tributaries in the State of Oregon to satisfy rights for lands in Oregon junior in priority, as set out in the decrees and abstracts of permits in evidence herein, to that of the diverters and water users affected thereby in the State of Washington, when the supply of water in said river system is insufficient during the summer season to satisfy senior rights in Washington and said report concludes that such use in Oregon is equitable as between the two states in this action.

(2) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and impliedly approves the unnecessary waste of water in the distribution of water in Oregon, in times of water scarcity in the stream system in Washington.

(3) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and impliedly approves a duty of water for irrigation lower than required to raise crops in Oregon and many times lower than that used successfully on similar soils in the State of Washington.

(4) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and impliedly approves a plan of distribution in use in Oregon whereby excess diversions are not required to be returned to the natural stream but are used as waste water without limitation by those not legally entitled thereto.

(5) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states

on an interstate stream and impliedly authorizes the upper water users in one state on the stream to divert all the waters of the stream without limitation and without regard to the relative priorities of the lower water users in another state.

(6) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and impliedly applies the doctrine of prescription to the wasteful, excessive and improper use of water in the State of Oregon.

(7) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and proposes a division of the water of the stream system whereby the lands in Washington, having a greater population and a greater irrigated area, are allotted less than one-third of the water available for beneficial use in the stream system.

(8) Said conclusion No. 3 (Page 115) erroneously disregards the equities existing between the two states on an interstate stream and improperly concludes that the waters of the stream system cannot practicably be apportioned between rights in the two states substantially on a relative priority basis, when such apportionments are repeatedly being successfully made under similar physical conditions by the Courts of our arid land states.

## III.

### As to Recommendations for a Decree

And the complainant excepts to the Special Master's recommendations for a decree (Page 115) in this:

1. That said recommendations disregard the agreement of the parties to this action relative to the water

rights on Mud Creek and its tributaries and Pine Creek and its tributaries, which is set forth in Stipulation No. 2 herein and the same should be included in a decree in this action.

2. That said recommendations disregard the water rights of the respective citizens of the two states to waters of the stream system and their relative priorities when the supply of water is sufficient or partially sufficient to supply the rights in each state and in effect awards the entire water supply of the stream system without limitation in time or quantity of use to the State of Oregon and its citizens.

3. That said recommendations are inequitable and are not sustained by the law and the evidence.

Respectfully submitted,

G. W. HAMILTON,
*Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant,*
*State of Washington.*

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

---

No. 11 Original

---

OCTOBER TERM, 1935

---

THE STATE OF WASHINGTON,
*Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

---

## PROOF OF MAILING MOTION FOR LEAVE TO FILE COMPLAINANT'S EXCEPTIONS AND COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

---

STATE OF WASHINGTON,
County of Thurston } ss.

The undersigned being first duly sworn on oath deposes and says that on the 13th day of November, 1935, at Olympia, Washington, he deposited in the United States Postoffice in sealed envelopes, one addressed to "Mr. Isaac H. Van Winkle, Attorney General, Salem, Oregon," one addressed to each "Mr. James A. Fee and Mr. Charles Z. Randall, Pendleton, Oregon," and one ad-

dressed to "Mr. George T. Cochran, LaGrande, Oregon," true copies of the Motion for Leave to File Complainant's Exceptions and Complainant's Exceptions to the Report of the Special Master in the above entitled cause.

Dorothy Hanson

Subscribed and sworn to before me this 13th day of November, 1935.

Jennie M. Tatterson

Notary Public, residing at Olympia, Washington.

My commission expires Nov. 25-1935

FILE COPY

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IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

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NO. 11 ORIGINAL

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OCTOBER TERM, 1935

---

THE STATE OF WASHINGTON, *Complainant,*

vs.

THE STATE OF OREGON, *Defendant.*

---

## BRIEF OF STATE OF WASHINGTON UPON COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

---

G. W. HAMILTON,
*Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant, State of Washington.*

STATE PRINTING PLANT

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## EXPLANATORY NOTES

The rights of the two States to the waters of Mud and Pine creeks and their respective tributaries have been settled by stipulation No. 2 herein. Certain other streams and tributaries lying to the west of the principal area in controversy have been eliminated from consideration herein by said stipulation. The remaining streams of the Walla Walla river system are in issue in this case. These remaining streams, and the area where the individual rights therein are being used, have been referred to in the record in this cause, as the *related* stream system and the *related* area, respectively. These terms with the same import will be used in this brief.

The following abbreviations herein refer respectively:

Ore. Abs.—Oregon Abstract of Testimony.

Wash. Nar. T.—Washington Narration of Testimony. (These are part of record by stipulation of September 21, 1935, approved by order of Court of October 14, 1935.)

c.f.s.—Cubic foot per second of time.

Bill of Comp.—Bill of Complaint.

Wash. Ex.—Washington Exhibit.

Ore. Ex.—Oregon Exhibit.

Sp. M. R.—Special Master's Report.

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

---

NO. 11 ORIGINAL

---

OCTOBER TERM, 1935

---

THE STATE OF WASHINGTON, *Complainant,*

vs.

THE STATE OF OREGON, *Defendant.*

---

## BRIEF OF STATE OF WASHINGTON UPON COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

---


G. W. HAMILTON,
*Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant, State of Washington.*

The State of Washington, by its Attorney General appearing in that behalf and with the authority, consent and direction of the Governor of said State, comes now and, in accordance with the Order of this Court of October 14, 1935, granting the parties permission to file briefs upon exceptions to the Special Master's Report herein, submits its brief upon complainants' exceptions to said report for filing in said cause.

By G. W. HAMILTON,
*Its Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant,*
*State of Washington.*

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## I.

## STATEMENT

### 1. TERRAIN OF THE STREAM SYSTEM

#### *a. Geological Formations*

This case involves the relative rights of the States of Washington and Oregon in and to the waters of the Walla Walla river, a non-navigable interstate stream rising in the State of Oregon and flowing through terri-

tory in the State of Washington. It is thought that the argument herein upon the exceptions to the Special Master's report will be made clearer by setting forth at the outset some of the characteristics of the stream system concerned and other matters necessary to an understanding of the issues involved.

The valley of the river and of its tributaries is underlaid with bedrock. The rock is folded in the form of a canoe-shaped basin, the deepest part of which lies in the region between Touchet and Lowden in Washington and about on the state line. There the bedrock is first reached somewhat below sea level and several hundred feet below the land surface. The bedrock gradually rises outward and entirely surrounds the greater part of the valley except in the west where there is a very narrow gap through which the stream escapes. In this canoe-shaped depression, the streams, in earlier ages, have laid down three principal deposits which make up the valley proper. (Wash. Nar. T. pp. 223-4.)

The oldest of these deposits has been termed the Gardena terrace. In the southwest portion of the valley in Washington, where the Gardena project is located, the terrace is approximately 125 feet above the flood plain of the Walla Walla river. Opposite Milton in Oregon it is perhaps 40 feet above. Further eastward and northward the terrace comes down nearly to the level of the flood plains.

Initially that terrace covered the entire basin. It was a smooth, continuous plain. It comprises two fans in form; one with the center about the present canyon of the Walla Walla river at Milton; another with its head near the present village of Tracy on Mill creek.

Those two fans declining westward, merged together in the vicinity of the place where the Yellowhawk creek now joins the Walla Walla river in rather a flat, smooth plain, which continued across the rest of the basin. (Wash. Nar. T. p. 224.)

After the formation of the Gardena terrace, the streams have cut into it and have formed the trenches through which the various streams now flow. Toward the heads of the two fans in the vicinity of Milton and Freewater in Oregon and in the vicinity of Walla Walla in Washington, the streams have almost completely cut away the top of the old terrace.

In a later stage the streams began to deposit gravel in the valleys which they had previously cut. The first of these deposits in point of time formed low terraces extending along, but from 5 to 20 feet in elevation above, the flood plain of the respective streams. Finally, the main stream of the Walla Walla river deposited the coarser gravel forming the gravel fan centering at the mouth of the canyon near Milton in Oregon. Mill creek made a similar deposit forming the gravel fan centering about 3 miles below the mouth of the canyon near Tracy in Washington. These fans extend outward as fingers, much like the pattern of one's hand, one along each of the streams, separated by remnants of the high terrace which project in between. The gravel fan rests on and overrides the tips of these remnants of the high terrace. The flood plains which continue on down are built of similar material to the fans but becoming progessively finer.

These three sedimentary formations together form the valley floor of the Walla Walla river basin. (Wash. Nar. T. p. 225.)

*b. Present Topography*

The alluvial fan of the Walla Walla river slopes northward from an apex at the mouth of the rock-walled canyon at Milton, Oregon. It is about 4 miles long and the same distance in width along its outer margin. At its apex the fan stands about 1070 feet above sea level; from this altitude it descends about 60 feet in a mile and stands about 850 feet above sea level along its outer margin.

The alluvial fan of Mill creek is less prominent than the fan of the main stream at Milton. This fan originates at an apex about 2 miles east of Walla Walla in Washington, slopes to the westward and is roughly delimited by Yellowhawk creek on the south, by the main channel of Mill creek on the north and by several remnants of the Gardena terrace on the west. It attains a maximum width of 1½ miles at Walla Walla, which is situated almost entirely on it at an elevation above sea level of about 990 f[illegible] Wash. Ex. 16, p. 21.)

A considerable portion of the lands irrigated from the stream system in the related area in the two states is situated on the gravel fans.

**2. THE RIVER AND ITS TRIBUTARIES**

*a. Names and Location of Stream Courses*

An examination of the general map of the river basin (Wash. Ex. 17) shows the sources of the stream on the west flank of the Blue mountains in the northeastern part of the State of Oregon. The main stream begins in two branches designated the North Fork and the South Fork. These branches converge about 4 miles above the city of Milton in Oregon to form the

main stream, which continues downward in a northerly direction through the gap between the mountains just above that city and into that city, where (at the Red Bridge, SW¼ NE¼ Sec. 12, Tp. 5 N., R. 35 E. W. M.) it divides into two courses. The easterly course, locally known as the Tum-a-lum river in Oregon, continues in a definite channel into the State of Washington, where it is known as the Walla Walla river. It then swings rather abruptly to the west and continues in a broad arc westward a distance of about 30 miles to the Columbia river near the village of Wallula, Washington. The other course of the main stream in Oregon is locally known as the Little Walla Walla river. It continues northerly but diverges to the westward from the main course of the stream at that point. The Little Walla Walla river, after flowing about a mile, at a point in the NE¼ of Sec. 2, Tp. 5 N., R. 35 E. W. M. (called locally "The Frog"), divides into two branches which are locally known, beginning with the easterly branch, as the Crockett branch and the Ford branch. The Crockett branch divides into the East and West branches of the Crockett. The West branch of the Crockett divides into three prongs, the two easterly of which rejoin, about 1½ miles below, the East branch of the Crockett and discharge into the East prong of the Little Walla Walla Spring branch in Oregon, which in turn empties into the East Little Walla Walla river across the line in the State of Washington. The East Little Walla Walla river, then about 1½ miles below (NE¼ Sec. 10, Tp. 6 N., R. 35 E. W. M.), meets and enters the main stream in its westward swing in the State of Washington. (Stipulation No. 2.) The westerly prong of the West branch of the Crockett unites with the Ford branch

(at a point in Sec. 22, Tp. 6 N, R. 35 E. W. M.) to form the West prong of the Little Walla Walla, which crosses the line into the State of Washington, where it is known as the West Little Walla Walla river. The course of the West Little Walla Walla river in Washington is generally northwesterly somewhat along the general course of the main stream but finally converging with the main stream at a point in the SE¼ of Sec. 31, Tp. 6 N., R. 35 E. W. M. The length of this tributary and its contributing channels is app oximately 7 miles.

The Little Walla Walla river in Oregon and the distributaries thereof which finally drain into the East and West Little Walla Walla rivers in Washington are short cut by-passes, avoiding the circuitous bend of the river, from the main stream further up in the State of Oregon to the main stream lower down in the State of Washington.

Further to the west from the main stream in the State of Oregon in Sections 22 and 27, Tp. 6 N., R. 35 E. W. M., rise the east and middle branches of Mud creek which unite to form Mud creek in the State of Washington. This tributary flows westerly and northwesterly a distance of approximately 11 miles and enters the main stream in Washington in Sec. 36, Tp. 7 N., R. 33 E. W. M. Further to the west in Oregon is Pine creek with its tributaries Dry creek, Swartz Spring branch and South Mud creek. South Mud creek crosses the state line north of Sec. 15, Tp. 6 N., R. 34 E. W. M., and flows westerly in Washington about a quarter of a mile from the state line to Pine creek. It is known as Little Mud creek in the State of Washington. Johnson creek, Goodman Spring branch and Dugger creek are spring branches in

Oregon in the watershed of Pine creek but have no surface channel connection therewith. (Stipulation No. 2.) Pine creek is a tributary of about the same length as Mud creek and enters the main stream in Washington in Sec. 2, Tp. 6 N., R. 33 E. W. M

The principal tributary on the Washington side of the main stream is Mill creek, which lies mostly in that state. It rises in numerous thread branches among the Blue mountains near the state line in the State of Oregon some 15 or 20 miles northeasterly from the source branches of the main stream, and flows across the state line into Washington northwesterly, westerly and southwesterly through the City of Walla Walla, entering the main stream near the Whitman Mission, in Sec. 31, Tp. 7 N., R. 35 E. W. M. None of the waters of the watershed of this tributary reaches the main stream in the State of Oregon. About 3 miles above the east city limits of the City of Walla Walla, Mill creek divides into two channels. The northerly channel, known as Titus creek, parallels, then unites with, the main channel of the creek about 2½ miles below the division. About 1½ miles below the division of Titus and Mill creeks, Mill creek again divides. One branch, about 8 miles in length, known as Yellowhawk creek, juts away southwesterly and short cuts to the main stream, entering the same in the NE¼ of Sec. 11, Tp. 6 N., R. 35 E. W. M. (Wash. Ex. 17.) Yellowhawk creek, in turn, divides about a half mile from its origin. One branch forming Garrison creek diverges from, then runs nearly parallel with, Yellowhawk creek, and enters the Walla Walla river in the NE¼ of SE¼ of Sec. 4, Tp. 6 N., R. 34 E. W. M. Cottonwood creek, Lasater Spring branch and Russel creek with its trib-

utary Reser creek, are tributaries of Yellowhawk creek entering the same from an easterly direction.

There are other small tributaries of the main stream in Washington which are not in issue in this cause and will not be enumerated here.

*b. Gradient of Stream Courses*

The gradient of the Walla Walla river decreases progressively down stream. The fall is approximately 80 feet to the mile at the confluence of the North and South forks of the river about 5 miles above Milton in Oregon. The average slope down the fan north of Milton is 60 feet to the mile. Across the state line in Washington, the gradient becomes gradually less to about 40 feet to the mile in the vicinity of the mouth of Yellowhawk creek. Further down the river the gradient becomes less until it is less than 10 feet to the mile at the mouth of the river. (Wash. Ex. 16, Vol. 1, p. 23.) The Little Walla Walla river and its distributaries in Oregon have an average gradient of about 60 feet to the mile.

The gradient of Mill creek is about 100 feet to the mile at the mouth of the canyon near Tracy, in Washington, 65 feet to the mile at Walla Walla and 50 feet to the mile just above its junction with the Walla Walla river near Whitman. (Stipulation No. 3.)

**3. CLIMATE AND WATER SUPPLY**

*a. Precipitation*

The principal part of the drainage basin of the river includes an area about 50 miles in length, approximately 30 miles in width at the greatest width and gradually lessening in width downward to a few miles at the mouth of the river. (Wash. Ex. 17.) The main stream drains

about 150 square miles of forested mountainous country above Milton which is moderately rugged and moderately high in altitude. Mill creek drains a lesser area above its canyon but of about the same forest character, ruggedness and altitude. (Wash. Ex. 16, Vol. 1, p. 24.)

The Walla Walla river basin has a semi-arid climate, with warm dry summers and cold wet winters. The mean temperature in the warmest month, which is generally July, is 73.9 deg. F. at Milton, 76.5 deg. F. at Walla Walla, and 72.8 deg. F. at Lowden. In the coldest month, which generally is January, it is 31 deg. F. at Milton, 30.9 deg. F. at Walla Walla, and 29.1 deg. F. at Lowden. The mean annual temperature is 52.6 deg. F. at Milton, 53.9 deg. F. at Walla Walla, and 51.3 deg. F. at Lowden. During the past ten years, the highest recorded temperature was 107 deg. F. and the lowest was –15 deg. F. During the same period, the latest killing frost in the spring has ranged from March 9th to May 9th, and the earliest killing frost in the autumn from September 21st to November 12th. The average growing season, or frost-free period, is 193 days. The average annual rainfall at Milton, during the 11 year period 1922-1932, was 12.99 inches, of which 1.54 inches fell during the three summer months, July, August and September. The average annual rainfall at Walla Walla during that period was 14.37 inches, of which 1.64 inches fell during the three summer months. The average annual rainfall at Lowden, during the same period, was 9.52 inches, of which 1.25 inches fell during the three summer months.

Little rain falls on the drainage area in the summer and a large part of the precipitation in the winter is snow. On the average the spring precipitation in April,

May and June approximates 2.68 inches and the average fall precipitation in October, November and December approximates 4.78 inches. The average winter precipitation during the months of January, February and March aggregate approximately 3.90 inches while the summer precipitation during the months of July, August and September aggregate 1.54 inches. The winter precipitation is about 2½ times, and the spring precipitation about 1¾ times, the summer precipitation, while the spring and fall precipitation together aggregate over 4 4/5 times the summer precipitation.

The United States Weather bureau measurements for the period from October, 1921, to and including September, 1933, show the average precipitation in inches for the respective months during that period as follows:

| Apr. | May | June | July | Aug. | Sept. | Total |
|---|---|---|---|---|---|---|
| .58 | 1.00 | 1.10 | .16 | .48 | .90 | 4.22 |
| Oct. | Nov. | Dec. | Jan. | Feb. | March | |
| 1.16 | 1.90 | 1.72 | 1.63 | 1.12 | 1.15 | 8.68 |

(Wash. Ex. 14, Vol. 1, p. 12)

*b. Sources of Water Supply*

The Walla Walla river and its principal tributary, Mill creek, are perennial streams. Their supply of water comes from rains and melting snow through the surface and subterranean drainage of the watershed. Due to the rather steep gradient, the surface drainage is rapid and the lower stream supply is quite responsive to heavy rains or rapidly melting snow on the watershed above. (Wash. Ex. 16, Vol. 1, p. 24.)

In addition to the supply of water in sudden freshets there is a perpetual contribution from ground water storage and drainage which break out in springs along

the courses. The supply of these springs is generally not transitory or sporadic but steady and constant. It is this source that furnishes the dependable water supply of the stream system in the summer or low water period. (Wash. Nar. T. p. 74.)

*c. Water Measurements*

The stream gaging records of the United States Geological Survey and of the State of Oregon measuring the flow of the Walla Walla river near the confluence of the North and South forks in Oregon are set out in Washington's Exhibit 18, pp. 22-76. These measurements cover the period from the fall of 1903 to 1933 inclusive. The measurements from 1903 to 1917 were not taken at identical points on the stream. Gaging stations in some instances were washed out and the measurements were intermittent and often estimated. These measurements are of little value (Wash. Nar. T. pp. 90-91) and will be omitted here.

The record of the measurements for the year 1929 are of no value for the reason that in that year the Milton power plant was diverting water from the river in that section past the gage in amounts unknown. (Wash. Nar. T. pp. 90-91.)

From 1918 to 1928 measurements were made at a point about one-half mile below the confluence of the North and South forks, designated station 212. From 1930 to 1933 two measuring points were used. One on the South Fork about a mile above its mouth, designated station 215, and the other on the North Fork about a half mile above its mouth, designated station 216. While these measurements were not made at identical locations, they were made at points relatively close enough

to reflect the approximate water supply in this section of the stream. (Wash. Nar. T. pp. 91-92.)

The power plant of the Pacific Power and Light Company is situated on the South Fork a short distance above the confluence of the North and South forks. The water for the power plant is diverted from the South Fork near the head of irrigation and carried to the plant through a pipe line about 7 miles in length. Gaging station 212 is located below the power plant and therefore reflects the true water supply so far as use for power is concerned, since the use of the power plant is non-consumptive. Gaging state 215 on the South Fork is also located below the power plant (Wash. Ex. 17), but does not reflect the loss from 19 small diversions above during the irrigation season amounting by the Oregon decree to 10.4 c.f.s. (Wash. Ex. 1.) There is little, if any, regulation above the forks (Ore. Abs. p. 52) and there is generally an over-diversion (Wash. Ex. 30, Table IV). This loss occurring 4/5ths of the period covered by the measurements is estimated to be 6 c.f.s. Gaging station 214 is located on the South Fork above the head of irrigation and its record is used here where available. (Wash. Ex. 17.)

Above the point of measurement on the North Fork (station 216) there are 13 small diversions for irrigation. The aggregate amount of these rights for irrigation is 7.28 c.f.s. (Wash. Ex. 1.) The gage readings at station 216 fall short of reflecting the actual water supply of the North Fork to the extent of the amount of water consumed in these diversions. It is estimated that the aggregate amount of the loss by these diversions is 5 c.f.s. (Wash. Nar. T. p. 101.)

The measurements above mentioned in the years 1918 to 1928 inclusive, and 1930 to 1933 inclusive, it would appear, furnish the most reliable data as to the stream supply in that locality of the stream. This case is concerned more strictly with the summer stream supply.

During the earlier part of the summer, the flow is affected by the snow conditions in the mountains, by the temperature conditions as to the rapidity of melting, and by the rainfall occurring in any particular month in adidition to the melting snow. The supply of water in this section of the stream during the month of June is generally abundant. During the period from 1918 to 1933 inclusive, with the exception of the year 1929 when the records are incomplete, the records of measurements show an average minimum for June of 205.4 c.f.s. and an average mean of 231.2 c.f.s. The lowest single reading in this month during the period was in 1926 when the supply was 90 c.f.s. This continued for one day only and the mean for the month in that year was 103 c.f.s. The year 1926 was the year of lowest water supply of the period. (Wash. Ex. 18, pp. 22-76.)

It is thought that the stream gaging records of the stations above mentioned for the months of July, August and September furnish the truest delineation of the stream supply during the low water stages.

The usual summer supply in this section of the stream is shown in the following table gathered from the record of measurements. (Wash. Ex. 18, pp. 22-76.) The maximum, minimum and mean flow during the month, the percentage of time in each month the flow is below the mean, the daily average of the below-mean

flow, and its percentage of the mean, in the months of July, August and September during the years specified, are as follows:

*d. Table—Summary of Measurements Near North and South Forks of Walla Walla River*

| *Month* | *Maximum* | *Minimum* | *Mean* | *Percentage of time flow below mean* | *Daily average of the below-mean flow and its percentage of the mean* | |
|---|---|---|---|---|---|---|
| | *c. f. s.* | *c. f. s.* | *c. f. s.* | *%* | *c. f. s.* | *%* |
| 1918 | | | | | | |
| July ..... | | 105 | 129 | 45.16 | 93.62 | — 72.57 |
| August ..... | 130 | 105 | 121 | 38.70 | 113.66 | — 93.93 |
| September .. | 145 | 108 | 128 | 26.66 | 114.87 | — 89.74 |
| (Station 212, Wash. Ex. 18 p. 39) | | | | | | |
| 1919 | | | | | | |
| July ..... | 134 | 112 | 121 | 66.66 | 117.15 | — 96.81 |
| August ..... | 112 | 103 | 109 | 35.48 | 105.72 | — 96.99 |
| September .. | 151 | 112 | 127 | 53.33 | 119.25 | — 93.89 |
| (Station 212, Wash. Ex. 18 p. 38) | | | | | | |
| 1920 | | | | | | |
| July ..... | 124 | | 112 | 45.16 | 107.35 | — 95.84 |
| August ..... | 164 | 100 | 112 | 64.51 | 104.25 | — 93.08 |
| September .. | 164 | 91 | 118 | 53.33 | 103.06 | — 87.33 |
| (Station 212, Wash. Ex. 18 p. 38) | | | | | | |
| 1921 | | | | | | |
| July ..... | 157 | 115 | 123 | 74.19 | 117.34 | — 95.39 |
| August ..... | | | 110a | | | |
| September .. | 159 | 11? | 123 | 63.33 | 115.23 | — 93.70 |
| (Station 212, Wash. Ex. 18 p. 40) | | | | | | |
| a. Estimated. | | | | | | |
| 1922 | | | | | | |
| July ..... | 170 | 127 | 142 | 58.06 | 132.38 | — 93.22 |
| August ..... | 150 | 123 | 132 | 67.74 | 128.80 | — 97.57 |
| September .. | 138 | 125 | 129 | 36.66 | 126.45 | — 98.02 |
| (Station 212, Wash. Ex. 18 p. 40) | | | | | | |
| 1923 | | | | | | |
| July ..... | 157 | 102 | 124 | 61.29 | 112.42 | — 90.66 |
| August ..... | 102 | 89 | 95.7 | 32.22 | 91.60 | — 95.71 |
| September .. | 102 | 86 | 93.2 | 46.66 | 90.57 | — 97.17 |
| (Station 212, Wash. Ex. 18 p. 41) | | | | | | |
| 1924 | | | | | | |
| July ..... | 118 | 90 | 99.4 | 54.83 | 93.70 | — 94.26 |
| August ..... | 116 | 91 | 98.7 | 58.06 | 94.05 | — 95.28 |
| September .. | 113 | 95 | 105 | 36.66 | 99.36 | — 94.62 |
| (Station 212, Wash. Ex. 18 p. 42) | | | | | | |

| Month | Maximum | Minimum | Mean | Percentage of time flow below mean | Daily average of the below-mean flow and its percentage of the mean | |
|---|---|---|---|---|---|---|
| | c. f. s. | c. f. s. | c. f. s. | % | c. f. s. | % |
| 1925 | | | | | | |
| July ..... | 115 | 90 | 100 | 51.61 | 95.50 — | 95.50 |
| August ..... | 110 | 90 | 98.7 | 54.83 | 94.23 — | 95.47 |
| September .. | 112 | 98 | 105 | 40.00 | 100.33 — | 95.55 |
| (Station 212, Wash. Ex. 18 p. 43) | | | | | | |
| 1926 | | | | | | |
| July ..... | 93 | 72 | 80.6 | 35.48 | 75.33 — | 93.46 |
| August ..... | 128 | 74 | 83.4 | 48.38 | 77.33 — | 92.72 |
| September .. | 117 | 98 | 105 | 53.33 | 101.00 — | 96.19 |
| (Station 212, Wash. Ex. 18 p. 44) | | | | | | |
| 1927 | | | | | | |
| July ..... | 143 | 88 | 106 | 54.83 | 93.47 — | 88.17 |
| August ..... | 93 | 80 | 88.7 | 61.29 | 87.94 — | 99.14 |
| September .. | 435 | 97 | 150 | 63.33 | 112.63 — | 75.08 |
| (Station 212, Wash. Ex. 18, p. 45) | | | | | | |
| 1928 | | | | | | |
| July ..... | 143 | 90 | 110 | 51.61 | 96.75 — | 87.95 |
| August ..... | 99 | 90 | 92.9 | 51.61 | 90.75 — | 97.66 |
| September .. | 115 | 63 | 89.2 | 33.33 | 71.10 — | 79.70 |
| (Station 212, Wash. Ex. 18, p. 46) | | | | | | |
| 1930 | | | | | | |
| July ..... | 115 | 59 | 81.5 | 67.74 | 74.19 — | 91.03 |
| August ..... | 97 | 67 | 82.2 | 48.38 | 76.06 — | 92.53 |
| September .. | 93 | 67 | 81.9 | 58.06 | 77.50 — | 94.62 |
| (Stations 215 and 216, Wash. Ex. pp. 56 and 60) | | | | | | |
| 1931 | | | | | | |
| July ..... | 99 | 82 | 87.2 | 64.51 | 83.90 — | 96.19 |
| August ..... | 85 | 80 | 83.4 | 64.51 | 82.45 — | 98.86 |
| September .. | 86 | 80 | 83.8 | 46.66 | 81.71 — | 97.50 |
| (Stations 214 and 216, Wash. Ex. 18, pp. 53 and 61) | | | | | | |
| 1932 | | | | | | |
| July ..... | 182 | 109 | 133.4 | 54.83 | 120.94 — | 90.65 |
| August ..... | 114 | 97 | 101.9 | 58.06 | 92.55 — | 90.91 |
| September .. | 136 | 97 | 100.6 | 58.06 | 97.66 — | 97.07 |
| (Stations 214 and 216, Wash. Ex. 18, pp.54 and 62) | | | | | | |
| 1933 | | | | | | |
| July ..... | 205 | 118 | 139.6 | 64.51 | 125.10 — | 89.61 |
| August ..... | 123 | 108 | 113.5 | 54.83 | 110.23 — | 97.11 |
| September .. | 117 | 109 | 112.7 | 63.33 | 110.73 — | 98.25 |
| (Stations 214 and 216, Wash. Ex. 18, pp. 55 and 63) | | | | | | |

To the measurements in the tabulation should be added the water which was being diverted above the places of measurement above mentioned on the North Fork, and on the South Fork, during the year 1918 to 1928 and in 1930, and was lost in irrigation. Roughly, this may be estimated at 11 c.f.s. The average monthly mean for the period, therefore, would approximate (c.f.s.): July, 123.58; August, 112.50; September, 121.09. The average summer mean in this section of the stream would approximate 119.05 c.f.s.

### *e. Water Supply Below Forks of Main Stream In Oregon*

A number of diversions from the main stream below the confluence of the North and South forks are made during the irrigation season. The section of the stream from this point to the division at the beginning of the Little Walla Walla river in Oregon has also additional support from ground drainage and springs and is a gaining stream. (Wash. Nar. T. p. 117.) The supply of water in this section of the stream in the summer if no diversions were taking place would be somewhat greater than that at the confluence of the forks.

The river divides into several natural courses on the alluvial fan beginning at the mouth of the canyon at Milton. The principal part of this division now begins with the Little Walla Walla river. The main stream continues northward in the vicinity of the easterly fringe of the fan. The Little Walla Walla river veers to the left from the main stream and again divides into several channels running down over the fan. In times of abundant supply, the water flows through all these channels to connecting streams in the State of Washington. In times

of water scarcity, during the summer, with the exception of a small quantity just sufficient to supply diversions between the Red bridge and Nursery bridge, all the water in the stream at the head of the Little Walla Walla river in Oregon, remaining after the diversions above the Red bridge, is diverted into the Little Walla Walla river. The surface of the bed of the main stream (locally called the Tum-a-lum from this point to the state line) then becomes dry from just below the Milton Nursery bridge for a distance of 1½ to 2 miles to just above the McCoy bridge, where springs arise, and channel surface flow in the main stream resumes. (Wash. Ex. 16, pp. 22-23.) The supply of the Little Walla Walla river is divided at the "Frog" and distributed principally through the natural channels known as the Ford and Crockett branches, heretofore described.

*f. Springs In Oregon*

In addition to the springs near and in the channel of the streams, there are roughly three spring zones on and near the Milton-Freewater fan in Oregon. These zones are parallel and concentric about the apex of the fan. The inner zone is 3 to 3½ miles down stream from Freewater and comprises about ¾ of the springs in the Walla Walla basin. The intermediate and outer spring zones are situated about 2 miles and 4 miles respectively beyond the inner zone and contain only a few springs. (Wash. Ex. 16 p. 89.) The drainage from these springs forms spring branches which are used for irrigation and some of them contribute to the supply of streams flowing into the State of Washington. The average aggregate daily flow of these springs in the related area in August, 1933, was 27 c.f.s. (Wash. Ex. 30, Table V.)

*g. Total Summer Supply In Oregon*

The average summer flow, as stated above, for the months of July, August and September is about 119.05 c.f.s. This together with the average summer flow of the springs and spring branches above mentioned, namely 27 c.f.s., totals 146.05 c.f.s. Roughly, the average summer supply of the stream in Oregon available for beneficial use, expressed in terms of running water is, therefore, 146.05 c.f.s. This does not include the supply of the steams to the west of the Milton-Freewater fan such as Mud and Pine creeks. The relative rights of the two states in and to the waters of Mud and Pine Creeks have been settled by Stipulation No. 2.

*h. Mill Creek Supply*

The records of the measurements of the Mill Creek water supply are incomplete. There are records of the measurements of the United States Geological Survey for the years 1914 to 1917 inclusive. There are no records for the dry years of 1924, 1925, 1926, 1930 and 1931. Measurements were carried on during the summers of 1932 and 1933 by cooperation of Oregon and Washington.

The source of water in Mill creek during the low water season with the exception of an occasional rain, is entirely from springs and ground water seepage in the mountains near its origin and continuing along its course down the valley. (Wash. Nar. T. p. 74.) The city of Walla Walla has an early right to divert 28 c.f.s. of water from this stream for municipal purposes. (Stipulation No. 2.) The intake is in the State of Oregon and water is diverted to measuring works located approximately at the state line. From the measuring point, the water is

carried by a pipe line to a reservoir near Mill creek about three miles above the city, from which the water is distributed in the city. Any surplus of water above the requirements of the reservoir is returned by means of a spillway to Mill creek above the mouth of Yellowhawk creek. (Wash. Ex. 17.) The average amount of the city's diversion approximates 22.63 c.f.s. (Wash. Ex. 18, p. 168.)

The Walla Walla city pipe line was installed and first used shortly after December, 1920. (Wash. Ex. 10 p. 118.) Prior to that time the diversion point for the city was lower on Mill Creek about 12 miles above the city.

The usual summer supply of upper Mill creek, not including the water diverted by the city of Walla Walla, is shown in the following table gathered from the records of measurements above mentioned. (Wash. Ex. 18, pp. 166-167; Wash. Ex. 19.) The maximum, minimum and mean flow during the month in the months of July, August and September during the years specified are as follows:

| Month | Maximum | Minimum | Mean |
|---|---|---|---|
| 1914 | | | |
| July | 39 | 32 | 35.5 |
| August | 33 | 32 | 32.6 |
| September | 60 | 32 | 36.4 |
| 1915 | | | |
| July | 37 | 27 | 29.8 |
| August | 27 | 22 | 24.4 |
| September | 31 | 22 | 24.1 |
| 1916 | | | |
| July | 103 | 32 | 59.9 |
| August | 37 | 27 | 30.7 |
| September | 42 | 26 | 29.1 |
| 1917 | | | |
| July | 106 | 36 | 61.0 |
| August | 34 | 28 | 31.3 |
| September | 51 | 28 | 30.8 |
| (Wash. Ex. 19) | | | |
| 1932 | | | |
| July | ... | ... | ... |
| August | 34 | 28 | 30.9 |
| September | 52 | 29 | 34.2 |
| 1933 | | | |
| July | ... | ... | ... |
| August | 44 | 33 | 35.4 |
| September | ... | ... | ... |
| (Wash. Ex. 18) | | | |

*i. Springs in Washington*

Around the fringe of the Mill creek fan in Washington there are numerous springs and spring branches contributing water to the stream system. The flow of these was measured in August, 1932, and in October, 1933. The average aggregate flow of these springs and spring branches, according to these measurements, is 15.78 c.f.s.. (Wash. Ex. 18, pp. 217-220; Wash. Ex. 30, Table IIa.)

*j. State Line Tributaries*

There is also a source of water for use in the State of Washington in the tributaries which cross the state line and flow into the main stream in Washington.

These tributaries are East Little Walla Walla and West Little Walla Walla and related spring branches. Measurements taken at the state line on these tributaries and branches during July and August, 1933, show an average aggregate flow during that time of 13 c.f.s. (Wash. Ex. 30, Table V.)

*k. Main Stream Supply in Washington*

Measurements taken in cooperation by the two states on the main stream at the state line in July, August and September of the year 1932 show a mean flow at that point for these months as follows (c.f.s.): July, 7.88; August, 5.32; September, 4.53. Measurements at the same point during the same months in the year 1933 show a mean flow as follows (c.f.s.): July, 9.35; August, 5.37; September, 5.57. The average monthly mean for the two years is as follows (c.f.s.): July, 8.61; August, 5.34; September, 5.05. The average flow at this point for the three month period, including both years, is 6.33 c.f.s. (Wash. Ex. 18, pp. 77-78.)

In addition there is a seepage gain in the supply of the main stream from this point to a point below the principal diversions from the stream in Washington. Measurements taken in the summer of the years 1932 and 1933 indicate an average gain in this section of the river during the months of July, August and September of 8.5 c.f.s. (Wash. Nar. T. pp. 116-117.)

*l. Total Summer Supply in Washington*

The records above mentioned do not include the dry years. It is impossible to make an accurate comparison of the water supply of the river system in Washington with that of the river system in Oregon. If the diminution of the stream supply in the dry years in Washing-

ton was relatively in the same proportion as during the same period in Oregon, which is probable (Wash. Nar. T. p. 237), the average of the measurements in the Washington area would be reduced from 15% to 20%. The average summer flow of Mill creek, including the diversion of the city of Walla Walla, shown in the incomplete records mentioned above, approximates 57.44 c.f.s. The average summer supply of the springs and spring branches aggregate 15.78 c.f.s. The average summer supply in the tributaries crossing the state line into Washington aggregate 13 c.f.s., and the average summer supply of the main stream aggregates 14.83 c.f.s. The aggregate total of all these is 101 c.f.s. A reduction of this total by 15% for purposes of comparison of this average summer supply with that in Oregon for the period there covered gives the estimated average summer supply in the stream system in Washington as 86 c.f.s.

#### 4. SOIL

##### *a. Soil Map*

F. O. Youngs, assistant soil surveyor with the Bureau of Chemistry and Soils in the United States Department of Agriculture (Wash. Nar. T. p. 254), made a study of the soils of the Walla Walla river basin and classified most of the areas involved with respect to their susceptibility to irrigation. (Ore. Abs. pp. 93-94.) The location of these soils with their respective classifications are set forth on a simplified map with explanatory "key" which were introduced in evidence as Washington's Exhibit 15. The two states concerned have agreed by stipulation No. 4 that this map contains a correct representation of the classifications and of the

areas of the several classes of soil and that the symbols indicated thereon have the meaning shown by the key attached to the map.

The map segregates the types of soil with respect to their susceptibility to irrigation into 10 classifications and differentiates and locates them by respective colors. The color and classification key attached to the map (Wash. Ex. 15) describes the type of soil of each classification and specifies the color representing each respective classification. The contents of the key are as follows:

**Key to the Simplified Soil Map of the Walla Walla Valley, Oregon-Washington**

| Group No. | Color | Group No. | Color |
|---|---|---|---|
| 1 | Deep green | 2B | Yellow |
| 1D | Purple | 3 | Orange |
| 1R | Pale green | 4 | Light purple |
| 1RA | Medium green | 5 | Brown |
| 2A | Pale yellow | 6 | Pink |

Group

1 —Deep, mellow alluvial soils occupying bottom lands or low terraces. Surface smooth to gently undulating. Contain little or no accumulation of alkali salts. Water holding capacity good. Drainage normally good though some areas are subirrigated to some extent and some are overflowed occassionally.

1D —Deep alluvial soils similar to Group 1, but not so well drained and commonly darker in color. Ground water level (water table) is in most places within 6 feet of the surface, affording subirrigation. Wetter spots need drainage for successful crop production. Salts are accumulated at the surface in places, but seldom in sufficient quantity to be harmful to vegetation.

1R —Deep, fairly friable soils occupying upland benches or ridges. Topography varies from smooth to rolling. Soils have good water holding capacity. Drainage is good except in a few small areas. Unevenness or steepness of surface causes difficulty in irrigation in places.

1RA—Soils identical to those of Group 1R but of very smooth surface. Mapped only in Gardena district.

2A —Rather shallow alluvial soils overlying gravel beds. Depth of fairly clean soil over gravel varies from 1½ to 4 feet. Require rather frequent irrigation in most places.

2B —Shallow, somewhat gravelly or stony alluvial soils over gravel beds. Depth of soil over gravel varies from 6 inches to 2 feet or rarely more. Frequent irrigation is necessary.

3 —Shallow, very gravelly or stony soils over beds of gravel and boulders. Water holding capacity is low and very frequent irrigation is necessary.

4 —Soils, occupying bottom lands or low terraces, rather strongly impregnated with alkali salts and having a high water table, usually within 6 feet of the surface. Usually supports a growth of salt grass, greasewood or alkali-weed. For successful crop production these soils must be reclaimed by washing or leaching with irrigation water, and provision for drainage is essential in many places. Lime hardpan is present in many places in the subsoils.

5 —Soils similar to those of Group 4, but lying on benches or slopes above the level of the bottom lands. The ground water level is not high at the present time. Alkali salt concentration is usually strong. These soils must be reclaimed by washing in order to successfully grow crops.

6 —Non-agricultural lands, including rough, broken and stony land and riverwash.

### *b. Composite Soil Groups*

The ten classifications of soil as to their susceptibility to irrigation may for practical purposes be thrown into three general composite groups. The first includes No. 6 soil shown in pink on the map (Wash. Ex. 15), is non-agricultural riverwash and may be eliminated from further consideration here. The next two composite groups were referred to in the testimony of Washington witnesses as Groups A and B. (Wash. Nar. T. pp. 161 and 174.)

Composite Group A is composed of the better and higher water duty soils and includes 1, 1D, 1R, 1RA, 2A, 4 and 5, shown in deep green, purple, pale green, medium green, pale yellow, light purple and brown, respectively, on the soil map. (Wash. Ex. 15.)

The 1 (deep green), 1D (purple), 1R (pale green) and 1RA (medium green) soils are generally deep, good texture and of good water-holding capacity. The surface of No. 1 soil is not very steep and is smooth to unrelated. The 1D soil is salt but the salt concentration not sufficient generally to harm plant growth. It is situated along the river and the water table is usually within 6 feet. The 1R and 1RA soils are well drained bench lands but the 1RA soils have the smoother surface and lie better naturally for irrigation.

The 2A (pale yellow) soil is alluvial, fairly clean, more shallow than the No. 1 soils, and overlies gravel beds. The 2A soil varies in depth from 1½ to 4 feet. (Wash. Nar. T. pp. 156-157.)

The No. 4 (light purple) soil is similar to 1D soil as to water table but it differs in that the salt concentration is strong enough to injure plant life. This soil is used largely for pasture and requires special treatment to overcome the injurious effects of the alkali.

The No. 5 (brown) soil is similar to No. 4 soil in salt concentration but is located on higher ground and does not at the present time have a water table. (Wash. Nar. T. p. 158.)

Composite Group B is composed of the gravelly and low water duty soils and includes 2B and 3, shown in yellow and orange, respectively, on the soil map. (Wash. Ex. 15.)

2B is alluvial soil overlying gravel beds similar to 2A but differs from 2A in that it contains more gravel and is shallower. It varies in depth from 6 inches to 2 feet.

No. 3 is the shallow, coarse, gravelly and stony soil over beds of boulders and gravel. It contains from 49% to 79% gravel, cobbles and stone. The useful soil depth is largely within the first 2 feet but there is some value in the third foot. (Ore. Abs. pp. 97-98.) To a depth of about 16 inches the soil between the stone and gravel is of a fairly heavy character, as heavy as silt loam. (Wash. Nar. T. p. 184.)

*c. Soil Group Location in Oregon*

The soil of the irrigated lands in the river basin in Oregon is generally a gravelly loam mixed with silt in varying degrees. The North and South forks and the main stream below their confluence extending down to the mouth of the canyon just above Milton in Oregon run through rock-walled canyons which include valleys ranging from a quarter to a half mile wide. The soil along the two forks and the main stream in this section of the stream system runs from cobble stone and gravel to fairly fine alluvial material overlying gravel. The depth of these soils varies from a few inches to several feet. (Wash. Ex. 15; Wash. Nar. T. pp. 16-17.) These soils are classified on Youngs' soil map (Wash. Ex. 15) largely as Classes 3 and 2B, with 2B type soil predominating.

The irrigated lands below the canyon at Milton tributary to the main stream and its distributaries in Oregon roughly lie in range 35 E. W. M. The soil of these lands includes all the classes represented on the soil map (Wash. Ex. 15) except types 1RA (medium green) and 5 (brown). The alluvial fan lying in township 6, sections 25, 26, 27 and 33, 34, 35 and 36, and in township 5, sections 1, 2 and 3 is composed largely of

the No. 3 (orange) soil type. Below the fan, all the soil types, with the two exceptions above noted, are found. Type No. 1 (deep green), 1D (purple), 1R (pale green) and 4 (light purple) predominate with type 1R including the greatest acreage of any one type in this area.

*d. Estimated Acreage of Soil Groups in Oregon*

An estimate of the acreage of irrigated lands in Oregon comprised in these several classes of soil types is tabulated in Washington Exhibit 21. The more compact irrigated areas, comprising practically all the low water duty lands of the related area in Oregon may be summarized to show the typical relationship of these soil classes, in the following manner:

The irrigated acreage in soil classes (1) along the forks and main stream to the canyon at Milton is as follows: (a) North and South forks: 1—39.15; 1D—5.75; 2A—63.88; 2B—101.65; 3—171.33. (b) Couse creek, not including Sections 18 and 19, Twp. 5 North, Range 36 E. W. M.: 1—3.30; 1R—13; 2A—11.90; 2B—10; 3—3.90. (c) Main stream from Section 21, Twp. 5 North, Range 36 E. W. M., down to and including Section 12, Twp. 5 North, Range 35 E. W. M.: 1—36.64; 1D—47.53; 1R—12; 2A—47.04; 2B—314.75; 3—166.49.

The irrigated acreage in soil classes (2) on the Milton-Freewater fan including Sections 1, 2 and 3, Twp. 5 North, Range 35 E. W. M., and Sections 25, 26, 27, 33, 34, 35, and 36, Twp. 6 North, Range 35 E. W. M., is as follows: 1—357.94; 1D—96.70; 1R—151.83; 2A—19; 2B—417.39; 3—2220.41; 4—140.50.

The irrigated acreage in soil classes (3) below the Milton-Freewater fan in Sections 13, 14, 15, 22, 23, 24

and 32, Twp. 6 North, Range 35 E. W. M., is as follows: 1—224.61; ID—440.67; 1R—508.20; 2A—30; 2B—157.20; 3—243.25; 4—355.80.

*e. Estimated Percentage of Acreage of Low Water Duty Soils in Oregon in the Areas Included in Above Tabulation*

Segregating and combining the total acreages in each of the soil classes included in the three general areas above enumerated into the two composite groups with regard to their respective water requirements, the average percentage of low water duty lands in each area is approximately as follows: (1) Along the two forks and main stream to the canyon at Milton, the soil is 75% low water duty. (2) On the Milton-Freewater fan, the soil is 78% low water duty. (3) The lands below the Milton-Freewater fan are composed of soil which is 20% low water duty.

*f. Soil Group Location in Washington*

The soil of the irrigated lands in the river basin in Washington comprises all the classes of the soil in Oregon with somewhat the same relative locations along Mill creek as that along the main stream in Oregon. On the whole, there is a greater proportion of the No. 1 soil classes in Washington. There is a considerable quantity of No. 4 (salt) land in the vicinity of Lowden which adds to the proportion of that class in the state of Washington. The 7,000 acres of land in the Gardena project are practically all deep soil class 1RA or 1R. A belt of No. 1 soil (about 4 sections of land) crosses the Mill creek fan dividing the No. 3 and 2B soil area thereof into an upper and a lower area. The upper area roughly comprises

about 4 sections and the lower about 3 sections. Three-fourths approximately of the No. 1 soil belt and nearly all of the lower No. 3 and 2B soil area lie within the limits of the city of Walla Walla. (Wash. Ex. 15.)

*g. Estimated Acreage of Soil Groups in Washington*

An estimate of the acreage of irrigated lands in Washington comprised in the several classes of soil types shown on the soil map (Wash. Ex. 15) is tabulated in Washington Exhibit 20. The more compact areas, comprising all the low water duty lands of the related area in Washington may be summarized to show the typical relationship of these soil classes, in the following manner:

The irrigated acreage in soil classes (1) along upper Mill creek down to the beginning of the Mill creek fan down to Section 13-7-36, including Sections 1 and 2, Twp. 6 North, and Sections 15, 16, 17 and 18, Twp. 7 North, all in Range 37, is as follows: 1—57.50; 2A—102.10; 2B—49.80; 3—64.40.

The irrigated acreage in soil classes (2) on the Mill creek fan including, in Township 7 North, Range 36 E. W. M., Sections 13, 14, 15, 16, 19, 20, 21, 22, 23, 27, 28, 29, 30, 31, 32, and Section 5, Twp. 6 North, Range 36 E. W. M., is as follows: 1—327.88; 1D—15.38; 1R—39.70; 2A—134.17; 2B—221.36; 3—872.41; 4—37.81.

The irrigated acreage in soil classes (3) of lands in the related area below the Mill creek fan, including in Township 7 North, Range 35 E. W. M., Sections 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35 and 36; in Township 6 North, Range 36 E. W. M., Sections 5 and 6, and in

Township 6 North, Range 36 E. W. M., Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15 and 16, is as follows: 1—2789.68; 1D—704.60; 1R—194.50; 2A—369.14; 2B—69.47; 3—173.68; 4—1263.85; 5—15.00.

With the exception of the lands in the Gardena project heretofore mentioned, the lands below the area above included are largely outside the related area, and are not included in the summary of typical soil classes. There are also lands lying to the south and east of the Mill creek fan which represent largely Class 1 and Class 1R soils. These do not change the typical soil class relationship and are not included in the soil class summary.

*h. Estimated Percentage of Acreage of Low Water Duty Soils in Washington in the Areas Included in the Above Tabulation*

Segregating and combining the total acreages in each of the soil classes included in the three general areas above enumerated into the two composite soil groups with regard to their respective water requirements, the average percentage of low water duty lands in each area is approximately as follows: (1) Along upper Mill creek down to the Mill creek fan, the soil is approximately 42% low water duty. (2) On the Mill creek fan, the soil is approximately 66% low water duty. (3) The lands in the designated area below the Mill creek fan are composed of soil which is approximately 5% low water duty.

**5. ORIGIN AND DEVELOPMENT OF WALLA WALLA RIVER WATER RIGHTS IN TWO STATES**

*a. Political Development*

The political development of the two states is set forth briefly in paragraph I of Stipulation No. 11 herein as follows:

Originally Washington was a part of what was popularly called the Oregon country. At this time the United States, Great Britain, Spain and Russia made claim to all or parts of this region. By treaty between the United States and Spain, February 22, 1819, Spain ceded to the United States all her rights in this region, north of the forty-second parallel. (8 U. S. Stat. L. 252) By treaty with the United States, April 5, 1824, Russia relinquished her claims to this territory. (8 U. S. Stat. L. 302) By treaty of October 20, 1818, the United States and Great Britain agreed that for a period of ten years the territory on the northwest coast of America westward of the Stony Mountains (Rocky Mountains) should be free and open to the vessels, citizens and subjects of both powers. (8 U. S. Stat. L. 248) This treaty was indefinitely continued in force by another treaty between the same parties on August 6, 1827, which provided that either party, at any time after October 20, 1828, might annul it by giving twelve months' notice to the other party. (8 U. S. Stat. L. 360) By joint resolution of the senate and house of representatives, under date of April 27, 1846, the President of the United States was authorized to give Great Britain the notice that was required for the abrogation of the treaty of August 6, 1827. (9 U. S. Stat. L. 109) The joint occupation of the territory between the Rocky Mountains and the Pacific coast was finally terminated and the boundary line between the possessions of Great Britain and the United States was fixed as the forty-ninth parallel of north latitude, Great Britain retaining the island of Vancouver, by treaty June 15, 1846. (9 U. S. Stat. L. 869)

On May 2, 1843, the inhabitants of the Oregon Country which was a somewhat indefinite term for the area drained by the Columbia River and lying west of the summit of the Rocky Mountains, met at Champoeg and organized a provisional government under the suzerainty of the United States. On July 5, 1845, representatives of the people again met and adopted what is known as the Organic Law of Oregon (Rev. Stat. Territory of Oregon, p. 33) This act was submitted to the people and ratified by popular vote of July 26, 1845.

All the territory of the United States lying west of the summit of the Rocky Mountains, north of the forty-second degree of north latitude was organized into the territory of Oregon, August 14, 1848. (9 U. S. Stat. L. 323) The territory of Washington was created out of part of the territory of Oregon by act of Congress, March 2, 1853. The territory of Washington included the present State of Washington and that portion of Idaho and Montana which is north of the forty-sixth parallel and west of the Rocky Mountains. (10 U. S. Stat. L. 172) The constitution of Oregon was adopted by convention on September 18,1857. This constitution so adopted became effective upon the admission of the State of Oregon to the Union by Act of Congress passed February 14, 1859 (11 Stat. L. 383) and by the acceptance by the State of the propositions submitted by Congress, which propositions were approved by the Legislative Assembly

of Oregon on June 3, 1859. (Ore. Code 1930, pp. 31-37, 63 et seq.) The present boundaries of the State of Oregon were then fixed and all the remainder of the then territory of Oregon was made a part of the territory of Washington. (11 U. S. Stat. L. 383, 384.)

Under date of March 3, 1863, the territory of Idaho, with boundaries the same as the present State of Idaho, was organized. (12 U. S. Stat. L. 808) On February 22, 1889 the Enabling Act, authorizing the Dakotas, Montana and Washington to form constitutions, was approved. The boundaries then fixed for the State of Washington were substantially the same as now existing. (Rem. Rev. Stat. of Wash., Vol. 1, p. 331) The constitution of the State of Washington was adopted by an election held in the state on October 1, 1889 and on November 11, 1889, the President of the United States proclaimed the admission of the state into the Union. (Rem. Rev. Stat. of Wash., Vol. 1, p. 347.)

*b. The Basis of Water Rights in the Two States*

Individual vested rights in the waters of the stream system exist in each state. The origin and protection of these rights are based generally on the doctrine of appropriation, which doctrine is recognized by the laws, customs and court decisions of the two states. When the supply of water in the stream is insufficient to satisfy all the individual vested rights therein, in accordance with their respective priorities, junior rights must stand aside for the benefit of senior rights in conflict therewith in either state.

At the same time each of these territories and later these states have recognized the doctrine of riparian ownership as a basis of rights in water for lands in private ownership. The difficulties inherent in attempting to reconcile the conflict of these two bases of rights in water led to legislation which, while saving existing rights, practically abolished the doctrine of riparian rights as a basis for acquiring new rights in water. In Oregon this legislation was enacted in 1909 (Ore. Code 1930, Title 49, Sec. 47, et seq.); in Washington, in 1917. (Rem. Rev.

Stat. of Wash. Ann., Title 48 Chap. 1, Sec. 7351 et seq.) This legislation in each state placed the ini iation of new rights and the consummation and use of existing rights under state regulation and provided for proceedings on the part of the state to determine existing rights relatively and to make a record of them for regulatory purposes.

Under authority of this legislation proceedings were instituted by the State of Oregon to determine the relative rights on a number of tributaries of the Walla Walla river in Oregon and finally the rights on the main stream in Oregon were determined, all by decrees of the court of that state. (Wash. Exs. 1 to 9 inclusive.) Similar proceedings were instituted in the state of Washington and resulted in decrees of the court of this state determining the relative rights on the tributaries and main stream of the Walla Walla river in Washington. (Wash. Exs. 11 to 13 inclusive.)

In addition to the adjudicated rights on the stream system in each state, the legislation mentioned authorizes the issuance, on the part of the state, of permits and certificates respectively for the initiation and consummation of rights in water, the same to be placed of public record.

Abstracts of these permits and certificates have been introduced in evidence in this case as Washington Exhibits 10 and 14.

The basis of rights adopted in these adjudication proceedings in the two states for practical purposes was that of appropriation. The basis of rights evidenced by state permits and certificates is that of appropriation.

It has been agreed herein by the two states concerned that for the purposes of this suit, the doctrine of appropriation shall apply to the rights of the individual landowners and water users in both states, by Paragraphs II and III of Stipulation No. 11, which are as follows:

II.

All the lands in the drainage area of the Walla Walla River in both states were originally public lands of the United States and that part of these lands now held in private ownership has been generally acquired under the public land laws of the United States; the lands along the upper reaches of the river were, at the time of the respective segregations from the public domain of the lands lower down on the stream system, and have been since, public lands of the United States and are now a part of the Umatilla National Forest Reserve.

III.

It is agreed that, for the purposes of this case, the individual rights of the respective landowners and water users concerned in both states are governed by the doctrine of appropriation and that no issue of riparian ownership as to such individual rights shall be raised in this case by either state.

### *c. Extent of Rights*

#### 1.) Acreage

Rights for the beneficial use of water on lands in either state are appurtenant to the lands on which the use is made and the place of use of such right may not be changed to other land without a permit from the proper state official. (Rem. Rev. Stat. of Wash., Vol. 8, Sec. 7391; Ore. Code 1930 Title 47, Sec. 47-712.) The acreage of lands in the related area in the two states, for which water rights are recognized in the two states with the years of priority is tabulated in stipulation No. 3 herein. These individual rights have been agreed upon by stipulation No. 1 herein, with the exception of the rights for 7,000 acres in the Gardena project in the State of Washington with a priority date of 1892. The priority

of this right is challenged by the State of Oregon. The total acreage shown in the tabulation is as follows: In Oregon, 10,775.25; in Washington, including the Gardena project, 19,836.55.

**2.) Authorized Water Duty in Oregon**

Decreed water rights in Oregon are generally expressed in miner's inches. A miner's inch under the Oregon law is equivalent to 1/40 of a cubic foot per second. All water measurements under Oregon decrees and permits are made at the point of diversion from the natural stream. (Stipulation No. 7.)

The general decree of the Circuit Court of Oregon, entered under date of February 20, 1933 (Wash. Ex. 1), determined the relative individual rights to the waters of the stream system in most of the related area in that state. In general, this decree awards 1½ miner's inches (.0375 c.f.s.) per acre , provided that where an irrigated tract is less than one acre and more than one-half acre, it shall receive 1½ miner's inches (.0375 c.f.s.) and where less than one-half acre it shall receive 1 miner's inch (.025 c.f.s.). There is also a provision in the decree (Wash. Ex. 1, p. 92) that "no rights of appropriation are hereby confirmed to divert a greater quantity of water than such appropriator can beneficially use for the purpose to which the water is to be put." The awards under this decree (Wash. Ex. 1) are for continuous use without seasonal limitation.

The decree of the Circuit Court of Oregon, entered under date of September 11, 1916 (Wash. Ex. 9), determined the relative rights to the waters of the West Prong of the Little Walla Walla river in Oregon for

each tract of land individually in amounts ranging from ½ miner's inch (.0125 c.f.s.) per acre to 1¼ miner's inch (.03125 c.f.s.) per acre, averaging approximately 1 miner's inch (.025 c.f.s.) per acre for all the lands involved, comprising between 800 and 1,000 acres.

The permits for the appropriation of water issued by the state engineer of Oregon fix the rights to the use of surface water in the part of the related area covered by said permits at a flow of ½ miner's inch (.0125 c.f.s.) per acre except as to the Pleasant View Irrigation Company rights, an additional amount of 20% was allowed by the court in the general decree (Wash. Ex. 1) for transportation losses. (Stipulation No. 7.)

**3.) Authorized Water Duty in Washington**

The general decree (Wash. Ex. 11) of the Superior Court of the State of Washington entered the 12th day of September, 1928, adjudicating the individual water rights in the stream system in the related area in Washington, provides that during the period in each year from July 1 to October 1, water shall be apportioned at the rate of 1 c.f.s. for each 100 acres of land involved in the individual claim; that during the period from October 1 to April 1 next, water shall be apportioned at the rate of 1 c.f.s. for each 50 acres of land involved in the individual claim; that during the period from April 1 to July 1 in each year, water shall be apportioned at the rate of 1 c.f.s for each 75 acres of land involved in the individual claim; provided that in all cases where water is used during any part of the period from July 1 to October 1, the amount of water diverted by each claimant for the year beginning October 1 shall not exceed 5 acre feet per acre. (Wash. Ex. 11, p. 146.)

The decrees (Wash. Exs. 12 and 13) of the Superior Court of the State of Washington, adjudicating the individual rights on Doan creek and on Stone creek, entered the 1st day of December, 1923, and the 10th day of July, 1923, respectively, involving between 900 and 1,000 acres along these two streams, establishes the duty of water for these lands at the rate of 1 c.f.s for each 75 acres.

Few permits for use of water on the related area in Washington have been issued by the state supervisor of hydraulics. Those issued involve about 300 acres and fix the duty of water at varying rates averaging approximately 1 c.f.s. for each 50 acres of land.

**6. Community Development**

The related area in Oregon has a population of about 5,000 people and this land has an assessed valuation of approximately 2¾ millions of dollars. The cities of Milton and Freewater have a population of about 2,300. The average farm unit in this area is about 10 acres. (Stipulation No. 3.)

The related area in Washington has a population of about 23,000 people and the land in this area has an assessed valuation of approximately 12½ millions of dollars. The city of Walla Walla has a population of about 16,000. The average farm unit in the related area in Washington is about 40 acres. (Stipulation No. 3.)

More or less the same types of crops are grown on the related areas in the two states. These consist principally of alfalfa, grains, vegetables and vine, berry and tree fruits. (Stipulation No. 3.)

While these communities on both sides of the state line are supported also by the surrounding territory,

the returns from the lands irrigated from the water of the Walla Walla river system have made large contribution to this development.

The first use of the water of the stream system, according to the priorities fixed in the decrees in evidence herein, began in Washington in 1859. Within three years thereafter, the use of the waters of the stream began in Oregon. The earlier development was along the main stream in Oregon and largely along Mill Creek in Washington. As new lands were taken up and development progressed in both states, more and more of the waters of the stream system were utilized until the need for water became greater than the supply, and that condition now exists. (Stipulation No. 3.)

### 7. PROCEEDINGS HAD AND ISSUES INVOLVED IN SUIT

In this action the State of Washington with leave of Court filed its bill of complaint in the Supreme Court of the United States seeking to have the Court determine the relative rights of the State of Washington and of the State of Oregon to the use of the waters of the Walla Walla river and its tributaries. The river is a non-navigable stream flowing within both states. The complaint further alleges in substance that the rights of the State of Washington in said stream have been and are being injured by the State of Oregon and asks that the defendant be enjoined and restrained from diverting or permitting to be diverted and used in the State of Oregon any of the waters of said stream or streams to which the defendant and its citizens are found not to be entitled and that it be required to permit and cause to be permitted to flow into the State of Washington the waters of the

said Walla Walla river and its tributaries to which it and its citizens are found to be entitled and for general relief. (Bill of Comp. pp. 13-14.)

The pleadings and stipulations defining the issues in the suit are set forth fully in the Special Master's report and recommendations for a decree (Sp. M. R. pp. 3-46) and will not be repeated here.

*a. Particular Statement of Washington's Contentions*

A particular statement of Washington's contentions based on the pleadings and stipulations is as follows:

1. That in regulating the adjudicated individual rights of its water users, the State of Oregon, its officers and agents have established the maximum per acre allotment set out in the decrees as the standard of apportionment for all lands in the related area in Oregon regardless of their respective actual water requirements and have not in the past apportioned and are not now apportioning water on the basis of economical beneficial use.

2. That in regulating the relative rights of the individual water users, the State of Oregon, its officers and agents have permitted and are permitting diversions of water from the Walla Walla river and its tributaries, including the spring branches and including also the Little Walla Walla river and its divisions and subdivisions, in excess of the actual water requirements of the lands in the related area in Oregon for which the diversions have been and are being made.

3. That in regulating the relative rights of the individual water users, the State of Oregon, its officers and agents, have disregarded the rights of the State of Wash-

ington and of the diverters from the river and its tributaries in the State of Washington by allowing diversions of water from the Walla Walla river and its tributaries, including the spring branches and including also the Little Walla Walla river and its divisions and distributaries, to satisfy rights in the State of Oregon junior in priority to that of the diverters affected thereby in the State of Washington.

4. That in regulating the relative rights of the individual water users, the State of Oregon, its officers and agents, have deprived and are depriving the State of Washington and its citizens of their proper and equitable share of the waters of the Walla Walla river and its tributaries by permitting at times during the summer season the diversion of the entire channel surface supply of the river at the division point of the Little Walla Walla river over and above that required for rights prior to those in the State of Washington through said Little Walla Walla river to satisfy rights in Oregon junior to those in Washington affected thereby, which junior rights in some instances are so used by reason of their place of use that the return water therefrom does not reach the main stream above the principal diversions from the river in the State of Washington.

5. That in regulating the relative rights of the individual water users, the State of Oregon, its officers and agents, have deprived and are depriving the State of Washington and its citizens of their proper and equitable share of the waters of the Walla Walla river and its tributaries by issuing permits and certificates of water right to use so-called waste water resulting from overdiversions for existing rights, by allowing and sanction-

ing the use of said so-called waste water without permits, and by permitting diversions of water from the Walla Walla river and its tributaries and from the Little Walla Walla river and its divisions and distributaries for the use of waste water, in disregard of the rights of the State of Washington, its citizens and water users in and to the waters of said stream system.

6. That the State of Oregon, its officers and agents, have required, authorized, permitted and sanctioned and are requiring, authorizing, permitting and sanctioning an unreasonable draught from the natural hydraulic head of the Walla Walla river system by failing to regulate the diversions of water from the main stream and the forks, above the Jewel West bridge located about 4 miles above the City of Milton and by failing to control and regulate the use of water from wells in the related area in Oregon, by authorizing, permitting and sanctioning wasteful and excessive diversions from the stream and by authorizing, permitting, and sanctioning excessive transportation losses in former and high water natural channels used to convey private water, to be charged against the natural supply of the stream system.

*b. Specific Issues*

The specific issues tendered by the parties are substantially as follows:

Stipulation No. 1 provides that the decrees and permits awarding rights in the related area in each state, with the exceptions therein specified, shall be accepted as evidencing the individual rights involved, as follows:

I.

That the rights specified in the abstract of water permits by the State Engineer of the State of Oregon, and in the decrees of the Circuit Court of said state for Umatilla county, in the following named cases, to-wit:

(1) Decree on the mandate In the Matter of the Determination of the Relative Rights to the Use of the Waters of Walla Walla River, etc., made and entered under date of February 25, 1933.

(2) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Pine Creek, etc., made and entered under date of March 17, 1924.

(3) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Middle Branch of Mud Creek, etc., made and entered under date of September 11, 1916.

(4) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of East Branch of Mud Creek, etc., made and entered under date of November 28, 1910.

(5) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Dugger Creek, etc., made and entered under date of March 5, 1917.

(6) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Goodman's Springs' Branch, etc., made and entered under date of June 29, 1911.

(7) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Johnson Creek, etc., made and entered under date of September 11, 1916.

(8) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of South Branch of Mud Creek, etc., made and entered under date of November 29, 1910.

(9) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of West Prong of Little Walla Walla River, etc., made and entered under date of September 11, 1916,—

and that the rights specified in the abstract of water permits issued by the State Supervisor of Hydraulics of the State of Washington, and in the decrees of the Superior Court of that State, Walla Walla County, in the following named cases, to-wit:

(1) Decree In the Matter of the Determination of the Rights to the Use of the Waters of the Walla Walla River, etc., No. 19075, made and entered under date of September 12, 1928.

(2) Decree on Remittitur In the Matter of the Determination of the Rights to the Use of the Waters of Doan Creek, etc., No. 14293, made and entered under date of December 1, 1923.

(3) Decree In the Matter of the Determination of the Rights to the Use of the Waters of Stone Creek, etc., No. 15409, made and entered under date of July 10, 1923,—

are hereby accepted and admitted as the relative individual rights

of the parties named therein, and of their successors in interest, in their respective states, for the use of water, in the amounts, for the purposes, and at the places or on the lands, set forth in said respective permits and in said respective decrees.

II.

That copies of said abstracts of permits and of said decrees shall be admitted in evidence in this case as competent proof affecting the respective rights of the two states, provided that the admission of the same, or of any part thereof, in evidence in this case, shall not be construed as, or held to be, an admission, waiver, abridgment or modification of any of the rights of either state as against the other in this case, relative to the following:

(1) The rights of the Gardena Farms District, successor in interest to the Walla Walla Irrigation Company.

(2) The water requirements of the lands to which water is awarded in any or all of said permits or in any or all of said decrees.

(3) The classification of soils of the lands watered from the streams of the two states.

(4) The past and present physical condition of the Tum-a-lum section of the Walla Walla River in the State of Oregon, and their relation to the diversion of the water of the stream through the Little Walla Walla River to the rights served thereby and to the diversions from the streams in the State of Washington.

(5) The relation of wells and of the rights of the users thereof for irrigation in the State of Oregon, to the stream system and to the rights of lower diverters therefrom for lands in the State of Washington.

(6) The underground waters of the lands in the State of Oregon, and their relation to the supply of water in the stream.

(7) The past and present use of water by diverters of water in Oregon as against diverters in Washington, and its relation to adverse use and estoppel, and the distribution of water in Oregon as a separate stream system.

The second paragraph of Stipulation No. 2 eliminates issues relating to the right of the City of Walla Walla, of Attalia Irrigation District and issues relating to rights on Touchet river in Washington and relating to rights on Goodman spring branch, Dugger creek and Johnson creek in Oregon and settles the rights on Mud and Pine creeks and their respective tributaries as between the two states.

The remaining specific issues tendered by the parties are substantially as follows:

1. PRIORITY OF GARDENA FARMS DISTRICT'S RIGHT

(1) The contention of the State of Oregon as set out in Stipulation No. 6 (Nov. 29, 1933) is that the rights of Gardena Farms District are not legally entitled to a priority date of 1892 for the reason that the original appropriators and their successors in interest were not and have not been diligent in the application of water to a beneficial use and the doctrine of relation does not apply to such rights; that the several tracts of land now irrigated from the works of the district are entitled to a priority date only as of the year in which each respective tract was first irrigated and that lands not yet irrigated are entitled to no water right.

(2) The State of Oregon further contends that the intention of the original appropriators was to irrigate such lands along the canal and laterals and in the vicinity of the lands of the Gardena Farms District as might be watered by gravity from a canal running southwesterly from the point of diversion into the State of Oregon and finally northwesterly back toward the Walla Walla river below the present Town of Touchet; that approximately 1675.6 acres of lands now irrigated in the district in that territory could not have been irrigated by gravity under the original plan (Oregon Exhibit 39); that the intention of the original appropriators was changed in 1904 when construction was begun of a shorter canal running more directly to the Gardena District territory with a siphon across Pine creek valley which delivers the water at a higher elevation and that the change of intention created

a new appropriation for these lands with priority dates beginning in the year 1904 and thereafter as each tract of land was first irrigated; that said dates of priority are substantially that shown by the dates of the contracts of sale listed in the agreed statement of facts.

(3) The State of Oregon further contends that the rights for lands in Oregon are vested and superior to the rights of the Gardena Farms District by reason of adverse use and estoppel.

(4) The State of Washington contends that the rights of the Gardena Farms District are as set forth in the Referee's report and decree of the Superior Court of the State of Washington in and for Walla Walla county in the case of *Washington v. Achermann et al.*, submitted in evidence in this cause as Washington Exhibit 11 and as set forth in the certificate of water right referred to as Exhibit "A" in Stipulation No. 5 herein.

(5) The State of Washington further contends that the priority of the right of the Gardena Farms District, under the admitted facts relating thereto, is not an issue in this case. The position of the State of Washington in this connection was stated in its objection to the submission of testimony calculated to attack the right of this district, which objection is stated in full at page 258 of Washington's Narration of Testimony, in connection with the narration of the testimony of E. C. Burlingame, witness for the State of Oregon. The objection will not be repeated here.

(6) The State of Washington further contends that the facts agreed upon in Stipulation No. 5 and the evidence submitted before the Special Master herein not

only fail to sustain the contentions of the State of Oregon with respect to this right but prove *affirmatively* that the original appropriators and their successors in interest at all times exercised reasonable diligence in consummating the appropriation initiated in the year 1892 and that from the beginning and at all times thereafter the original appropriators and their successors in interest initiated and made said appropriation with the intention and purpose of irrigating the lands in the Gardena Farms District and the other lands now irrigated from the works of the district, and that there was at no time during the consummating of this right any change of intention to carry out the original and continuing object of the appropriation.

### 2. WATER REQUIREMENTS

(1) The amounts of water allotted in the several decrees, state permits and certificates of water right for lands in the State of Washington are challenged in the answer of the State of Oregon to the bill of complaint. These amounts are not mentioned in Stipulation No. 7 relating to water requirements and no evidence was introduced by the State of Oregon in support of the allegations of the answer relative to the duty of water for lands in the State of Washington. We assume that the State of Oregon is making no point in this case at this time of the duty of water for lands in the State of Washington.

(2) In the statement of issues set out in Stipulation No. 7 the State of Washington specifies its contention as to water requirements for each type of soil indicated on F. O. Youngs' soil map (Washington Exhibit 15). These soil types are combined in the stipulation into five groups

for water requirement purposes, and the water duty is alleged in terms of running water but limited for an irrigation season of 6½ months in terms of volume of water. The evidence submitted in behalf of the State of Washington before the Special Master herein, was based on a further combination of these soil types into two groups and the same duty of water was specified for all the types of soil falling in each of the two groups. To simplify the issues involved, we will adopt the grouping of soils used by the witnesses for the State of Washington. These two groups will be referred to as Group A and Group B. Soil types included in Group B are the soils underlaid with gravel and are indicated on the soil map (Exhibit 15) as Types 2-B and 3. Soil types included in Group A are the soils of better water-holding capacity and include all the other types indicated on the soil map.

The contention of the State of Washington is that the water requirement for lands in Group A should not exceed 1/80th c.f.s. (½ miner's inch) for each acre of land measured at the diversion point on the natural stream and that the water requirement for lands in Group B should not exceed 1/40th c.f.s. (1 miner's inch) for each acre of land measured at the diversion point on the natural stream.

(3) The contention of the State of Oregon relative to water requirements, as alleged in Stipulation No. 7, is that "the rights of said state and of its citizens and water users to the use of surface waters of said state are as fixed by the decrees of the courts of said state, and the permits for the appropriation of water issued by the

state engineer of the said state and by the use of said waters."

(4) The State of Washington does not for the purpose of this action question the water requirement fixed by the State Engineer of Oregon in permits issued by that officer.

(5) The State of Washington does not for the purpose of this action question the water requirement fixed in the decree of the Circuit Court of the State of Oregon for Umatilla county determining the rights on the west prong of the Little Walla Walla river (Washington Exhibit 9). The State of Washington does not for the purpose of the injunctive relief sought in this action question the water requirement fixed in the decree of the Circuit Court of the State of Oregon for Umatilla county on mandate determining the rights on the Walla Walla river (Washington Exhibit 1) for the lands irrigated by the Milton-Freewater and Hudson Bay Company.

(6) The State of Washington questions the water requirement fixed in said decree (Washington Exhibit 1) for all other lands described therein in so far as the same is greater than that contended for by the State of Washington.

(7) The State of Oregon further alleges in Stipulation No. 7 that any limitation of water on an acre-foot basis is impracticable and would destroy the flexible use of the water to which the water users have acquired a right.

(8) The State of Washington denies that a right to a flexible use of the water in excess of the water requirement contended for by Washington, has been acquired by

any water user in the State of Oregon and denies that any limitation of water on an acre-foot basis is impracticable.

(9) The State of Oregon further alleges that it, its citizens and water users are entitled to the respective amounts awarded to and used by them on the lands in the related area by virtue of vested rights, the statute of limitations, adverse use and estoppel, the legal sufficiency of which claim is challenged by the State of Washington.

(10) In the testimony submitted before the Special Master, witnesses for the State of Oregon testified that it would be impossible and impracticable to administer and regulate the distribution of water to the several lands in the related area in Oregon for soils of different water requirements in accordance with the soil classification indicated on F. O. Youngs' soil map (Washington Exhibit 15). The State of Washington contends that for the purpose of determining the relative rights of the two states in and to the waters of the stream system in the instant case, the diversion duty of the several individual rights on the stream may be aggregated and averaged at the diversion points on the natural streams.

### 3. WELLS

(1) The State of Washington contends that the ground water in, adjacent to, and along the Walla Walla river in the Milton-Freewater territory, comes from the stream through the narrow gap immediately above; that this ground water is not fugitive percolating water, having an unknown destination, but is stream seepage water flowing freely, generally along with and toward the stream channel; that it constitutes a part of the surface

stream itself and is simply an incident thereto; that the use of water from wells in this territory during the summer irrigation season in each year intercepts a source of natural supply of the water of the stream system, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users of their just and equitable share of the waters of the stream system.

(2) In accordance with Stipulation No. 9 (Dec. 9, 1933) the State of Washington alleges that the State of Oregon, its officers and agents have sanctioned and permitted the use of, and the users of the waters of said wells have used and are using said waters for irrigation in excess of the amounts necessary for said purpose, without regard to the rights of the lands to water by surface diversion from the stream system, and without regard to the rights of the diverters of water from the stream system to the benefits of the natural underground drainage to the stream.

(3) The State of Oregon as set forth in said Stipulation No. 9 (Dec. 9, 1933) contends and alleges that the waters in said wells were and are percolating waters in the soil of said landowners and belong entirely to said landowners under the laws of both the States of Oregon and Washington; that the ownership of said percolating waters and the right to the use thereof is a vested property right and neither the State of Oregon nor the State of Washington has any right to regulate the use of such percolating waters under the laws of either state; that the wells in the State of Oregon and the water therein constitute no part of the Walla Walla river or its stream system, and the regulation of the use of said percolating

waters is not within the jurisdiction of this court; that the pumping of waters from said wells does not appreciably affect the supply of underground water and in no way injures any citizen or water user of the State of Washington, or deprives them of any water; that the wells used for irrigation were dug and equipped at a large expense; that the pumping of water therefrom, on account of the cost of power and the depreciation of equipment, costs each user large sums of money each year and that said expenditures regulate the extent of the use of said wells and said wells are used only for a beneficial use and as a supplemental supply, as and when the supply of surface water to the respective well owners from the streams and springs diminishes, or is shut off on account of insufficient water in such streams and springs to supply the appropriations.

**4. ADVERSE USE, ESTOPPEL, VESTED RIGHTS, TUM-A-LUM RIVER, AND SEPARATE ADMINISTRATION IN OREGON**

(1) In accordance with Stipulation No. 10, the State of Oregon contends and alleges that it and its citizens and water users have acquired by adverse use and prescription the right, which has now become vested, to use all or so much of the waters of the Walla Walla river and its tributaries as is required to supply the appropriations of the citizens and water users of said state in the amounts for the acreages set forth in the court decrees and state permits of said state without regard to any right or claims of right of any diverter lower on the stream in the State of Washington.

(2) The State of Washington, reserving its rights under the motion to strike affirmative defenses previously

filed with the Court in said action and asserting its contention and claim thereunder, and challenging the legal sufficiency of Oregon's affirmative defenses, contends and alleges, among other things heretofore mentioned, that the State of Oregon, its citizens and water users have no vested rights against the State of Washington, its citizens and water users, to the waters of the Walla Walla river and its tributaries in excess of the amounts reasonably necessary for their respective economical beneficial uses, according to their respective priorities as set out in the Oregon decrees and permits referred to in Stipulation No. 1 in their relation to the rights and the respective priorities thereof of the citizens and water users of the State of Washington, also referred to in said Stipulation No. 1, to the waters of said stream system.

(3) The State of Oregon further contends and alleges in Stipulation No. 10 that the State of Washington, its citizens and water users are estopped from asserting any right to the use of the waters of the Walla Walla river and its tributaries flowing in Oregon as against or prior to any appropriation in the State of Oregon by the citizens and water users of said state, on the ground that the citizens and water users of Oregon have spent time and money in providing for water, in developing and improving their lands, and in creating community settlements dependent upon the use of this water; that a withdrawal of this water or any portion thereof, would render the Oregon lands barren and their improvements and development valueless and would result in irreparable damage and injury to the State of Oregon, its citizens and water users; that the State of Washington, its citi-

zens and water users at all times had full notice and knowledge of this use of water and of this improvement and development and made no protest, took no steps to prevent the same and asserted no claim of right to use said waters as against the State of Oregon, its citizens and water users.

(4) The State of Washington denies that the State of Oregon, its citizens and water users have any vested water rights by reason of estoppel or otherwise, as against the State of Washington, its citizens and water users, any different or having any greater legal effect, from the vested water rights of the State of Washington, its citizens and water users, as against the State of Oregon, its citizens and water users, and alleges that the State of Washington, its citizens and water users have also relied on their appropriations, diversions and use of water and have expended money and labor for similar purposes and with like results as that mentioned by Oregon.

(5) The State of Oregon further contends and alleges that at all times from the beginning of irrigation in the State of Oregon, said state, its citizens and water users have distributed and used the waters of the Walla Walla river and its tributaries for irrigation, domestic, power and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and beginning with about the year 1888, such use and distribution of water has turned all water, not necessary for irrigation, out of the Tum-a-lum, into the Little Walla Walla river, and rendered the Tum-a-lum river in Oregon dry during the months of July, August and September of each year, and during a part of June and a part of October in many

years; and all appropriations and diversions of water in the State of Washington made after said year of 1888 were made with notice and knowledge that said Tum-a-lum river went dry each year during the said dry season, and subject to the limitation of water supply occasioned by said stream going dry during said season, and without the intention of claiming or asserting any right to have water flow in said Tum-a-lum river during said dry season. That the Tum-a-lum river in Oregon is a losing stream and its continuation in Washington, as the Walla Walla river is a gaining stream, and at the time in each year the Tum-a-lum river in Oregon goes dry, there remains flowing in the Walla Walla river and its tributaries in Washington more than sufficient water to supply all claimed rights. Said Tum-a-lum river is a stream with a bed from 100 to 1,500 feet wide in a coarse, gravelly soil, through which the water readily sinks and percolates, and to conduct water in said channel during said dry season would require the full flow of the stream and would cause an unreasonable waste.

(6) The State of Washington denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to any water of the Walla Walla river and its tributaries by reason of the contention and alleged claim; that at all times from the beginning of irrigation in the State of Oregon, said state, its citizens and water users, have distributed and used said water for irrigation, domestic, power and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part

thereof in the State of Washington; and the State of Washington alleges that the Walla Walla river and its tributaries constitute an interstate stream system; that the natural downward course of water is continuous through the same; that the natural loss of water in the Tum-a-lum section of the stream is not excessive, the gradient in the same being approximately 60 feet to the mile; that the water naturally disappearing in the surface of said section remains in the stream system, and contributes to the supply of the water of the river and its tributaries in the State of Washington; that the State of Oregon, its citizens and water users, do not, and cannot, legally have, as against the State of Washington, its citizens and water users, the exclusive right to the waters of said stream system or any part of the same in the State of Oregon; that the surface supply of water in the stream system during the summer irrigation season in each year is inadequate to satisfy all the individual rights on said stream system according to their respective priorities in both states; that the distribution and use of the waters of the Walla Walla river and its tributaries by the State of Oregon, its officers, agents, citizens, and water users, as a stream system wholly in Oregon, separate and independent of any part of said system in the State of Washington, to the extent to which the same may in any year have been accomplished, without regard to the rights of citizens and water users of the State of Washington, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users, of their just and equitable share of the waters of the stream system.

(7) The State of Washington further alleges that as against the State of Washington, its citizens and water users, the decrees of the courts of the State of Oregon, and the permits of the state engineer of said state, neither determine nor fix any rights, except as admitted in this cause.

(8) Stipulation No. 10 provides that the affirmative allegations on the part of the State of Washington are deemed denied by the State of Oregon, except as admitted in any statement of agreed fact filed or to be filed in this case.

By order of this Court (February 20, 1933) Hon. William W. Ray was appointed Special Master with authority to take evidence and directed to make findings of fact and conclusions of law and to submit the same to this Court together with his recommendations for a decree.

In accordance with this order the Special Master heard the case on the stipulations of fact and oral testimony involving the issues tendered by the pleadings and stipulations of the parties, and has submitted to the Court his findings of fact, conclusions of law and recommendations for a decree. (Sp. M. R. pp. 1-2.) It is recommended in the Special Master's report that a decree be entered dismissing complainant's bill of complaint. (Sp. M. R. p. 115.)

The case is now before the Court on the record agreed upon by stipulation of the parties under date of September 21, 1935, approved by this Court, the Special Master's report and exceptions thereto filed by the complainant.

## II.

## ARGUMENT

### REVIEW OF COMPLAINANT'S

### *1. Exceptions to Special Master's Report*

A statement of the causes of exceptions is set forth in the complainant's exceptions to the report of the Special Master. These causes will be considered here under the same titles and substantially in the same order in which they appear in the statement.

### (I)

### As to Findings of Fact

1.) It is believed that the report of the Special Master passes over and fails fully to consider physical conditions of the stream system which have an important bearing on the issues and should be considered by the court in determining this case. A suggestion of these physical conditions is found in the statement of the forepart of this brief. They consist, among other things, of the extremes of water supply in the fall and spring which tend to lead to erroneous conclusions as to the fairly constant supply of the stream in the summer low water flow; the old stream channels, which are used to transport water and which constitute a wasteful system of water distribution—just as wasteful relatively, in our view, as the natural channel of the Tum-a-lum section of the main stream in Oregon, which latter channel, Oregon claims, for this reason, cannot be used to transport water during the summer low water flow, for the use of water users in the State of Washington; the ground water reservoir under the Milton-Freewater fan,

which is being diffused by irrigation from 300 wells tapping the same.

(1) The Master's report assumes that the summer flow of the Walla Walla river is sporadic and unreliable. It is stated (p. 53):

"All of the streams contributing to the Walla Walla River are supplied in the main from the snow falling during the winter period in the Blue Mountains. With the warmer temperatures of spring these snows are melted and the streams carrying off this water attain their highest stream flow. As the temperature is variable, so the stream flows are variable. They vary not only between the spring and the summer, but they vary from day to day and from month to month. Warm winds and sunshine give them a large supply and colder weather shrinks them. The summer rains covering 150 square miles of drainage area are gathered into these streams and augment their flow.

"An agricultural community cannot develop and maintain itself upon sporadic supplies of water. The farmer must be able to place reasonable dependence upon the water supply if he shall make the expenditures and put forth the effort necessary to reap the harvest incident to the combination of the soil with the water."

It is made to appear from the foregoing that the summer supply of the river is intermittent and not dependable and that the water users of Oregon are, therefore, justified in claiming the right to, and having available, excessive amounts of water much of the time to insure themselves with sufficient water in the intervals of limited supply.

In our view, the summer flow of the stream is not sporadic but dependable. A tabulation of the stream measurements for a period of the last 15 years is hereinabove set out. This tabulation shows that when the flow of the river is below the mean flow for each month

in the months of July, August and September, it is on the average within 93% of the mean. A minimum flow which varies less than 7% may obviously be considered dependable and fairly constant.

It is submitted that the summer stream flow in the main stream in Oregon is not of such an unreliable character that the Oregon water users are for that reason entitled to an excessive allowance of water for irrigation. When it is considered that a blanket maximum allowance of 1½ miner's inches per acre continuous flow has been fixed in the general Oregon decree (Wash. Ex. 1) for the greater part of the lands in the related area comprising a considerable acreage of higher water duty soils, it appears to us, that more than ample provision is made by this type of award of water allotments, for the fluctuation in the stream supply during the summer low water period.

(2) The Special Master's report, it appears to us, overlooks the physical conditions of the stream system in the statement on page 54 thereof, to-wit: "The evidence is uncontradicted that each year from 1880 to 1930, when the spring high water ceased, the irrigators within the State of Oregon continuously and without interruption and without protest, appropriated to their use all of the flow of the Walla Walla river rising above the Red bridge."

This statement has a bearing on the issue of estoppel and adverse use claimed on the part of Oregon and overlooks the progressive development of lands in the related area in Oregon and the gradually increased use of water on the Milton-Freewater fan in Oregon and

implies that beginning with the year 1880, the Oregon water users appropriated *all* the waters of the stream arising above the Red bridge. This statement disregards the physical conditions which manifestly contradict the correctness of the conclusion.

It would be a physical impossibility for the water users of Oregon *to use* all the water of the main stream after the spring high water had ceased in each year from 1880 to 1930. An examination of the tabulated priorities and approximate acreages contained in Stipulation No. 3 herein (Sp. M. R. pp. 36-37) shows that in the year 1880 there were 1137.65 acres using water from the Walla Walla river as a whole. If from this total of 1137.65 acres, the amount of the rights on lower spring branches with priorities of that or earlier dates, amounting to 361 acres (Wash. Ex. 1) are eliminated, the remainder is 776 acres of land using water from the upper river including the Little Walla Walla dividing at the Red bridge. If the mean flow of the river during the summer months for the 15 year period, to-wit: 119.05 c.f.s., is taken as the amount of the flow of the upper river in 1880, it would mean a diversion in that year of 1 c.f.s. for every 6½ acres of land irrigated or 9⅓ acre feet per month.

In 1885, using the same method of calculation, the acreage entitled to water from the upper river was 1278 acres (Wash. Ex. 1) using the mean flow as the amount of water available in the upper river, the diversion in that year would have been 1 c.f.s. for every 10¾ acres of land irrigated or approximately 5¾ acre feet per month.

In 1890, by the same method of calculation, the 1745 acres then entitled to water from the upper river (Wash. Ex. 1) would have used 1 c.f.s. for every 14⅔ acres of land irrigated or 4⅙ acre feet per month. In 1895 the 2457 acres then entitled to water from the upper river (Wash. Ex. 1) would have used 1 c.f.s. for every 20⅔ acres of land irrigated or 3 acre feet per month.

While against these amounts must be charged natural channel transportation losses in some instances, such losses would not change the result sufficiently to show such deluges of water could have been beneficially used or legally appropriated. In our view, excessive diversions cannot legally consummate appropriations for the amounts of the excess. Waste of water is not tolerated in arid regions.

*Atchinson v. Peterson*, (1874) 1 Mont. 561, 87 U. S. (20 Wall) 507, 22 L. ed. 414;
*Combs v. Agricultural D. Co.*, (1892) 17 Colo. 146, 28 P. 966;
*Hugh v. Porter*, (1909) 51 Ore. 318, 98 P. 1083;
*Shafford v. White Bluffs, etc.*, (1911) 63 Wash. 10, 114 P. 883.

The tabulation of priorities and approximate acreages contained in Stipulation No. 3 (Sp. M. R. pp. 36-37) shows a progressive extension of irrigated acreage from the time of the earliest priority on the stream in Oregon to the year 1931.

It is submitted, therefore, that the conclusion in the Special Master's report (p. 58) "that for more than 50 years last past, during the summer irrigation season, the Oregon irrigators have *appropriated* to themselves all the flow of the Walla Walla river at the Red bridge"

could not only not legally have taken place but is inconsistent with the existing physical conditions.

(3) It appears to us that the Special Master's report fails to give full recognition to the physical conditions of the Tum-a-lum section of the main stream in Oregon and the rights of the lower water users in Washington to the use of this natural stream bed along with other natural channels of the stream system for the conveyance of the drainage of the upper river system to the river below in accordance with their respective rights in the stream.

The Special Master's report (pp. 53-54) calls attention to the fact that the bed of the Tum-a-lum river in Oregon in the section between the Nursery bridge and the McCoy bridge varies in width from 150 to 1500 feet and runs through cobblerocks underlain to great depths with gravel and that this channel is an extremely wasteful channel. It is stated that "In order to avoid this waste and to make the waters of the Tum-a-lum river available for use within the State of Oregon, the irrigators began as early as 1898 to put crude and temporary dams across the channel of the river at the Red bridge * * * and thereby and thereafter during periods of low water, diverted all the waters of the Walla Walla river into the channel of the Little Walla Walla river, permitting to flow by said dam only that small quantity of water necessary to supply the right of the East Side ditch, which takes out of the river just below the dam."

The record shows that in any event the drainage of the upper river flows through the Tum-a-lum section

in the fall and in the spring and early summer up to the time or times all the water of the river is diverted at the Red bridge. (Wash. Ex. 18, pp. 77-78.) It must be admitted that springs rise in the channel of the main stream just below the McCoy bridge and that the flow of the stream below is perennial irrespective of any diversion into the Little Walla Walla river at the Red bridge. In our view, the conclusion is inescapable that at least part of the drainage of the upper river proceeds down stream underneath the surface of the channel in the Tum-a-lum section and again reaches the channel surface near and below the McCoy bridge. This naturally follows from the fact that the only source of the waters of the stream at this place is from the upper drainage and ground water. (Wash. Nar. T. p. 235.)

The diversion of the main stream into the Little Walla Walla river at the Red bridge is into a natural channel which carries the water to other distributaries below which are also natural channels. The natural channels run over the Milton-Freewater fan above the same type of subsoil as that underlying the Tum-a-lum section of the river. The waste of these natural channels is great. This waste in the natural channels is mentioned by Oregon as one of the reasons which justify the Oregon water users in securing an unusual supply of water for irrigation.

That the Washington water users should be deprived of water for the reason that a section of the river through which part of their water must travel is wasteful and at the same time that Oregon users should be awarded an unusual amount of water for the same reason that the Washington users are deprived of it, ap-

pears to us, to be inconsistent and prejudicial to the rights of the State of Washington in the stream system.

(4) In considering the Tum-a-lum section of the main stream in Oregon as the principal channel through which water must flow to the State of Washington for the use of Washington irrigators, the Special Master's report gives little consideration to the fact that the Little Walla Walla river and the Crockett and Ford branches have direct natural connection with the heads of natural tributaries leading to the main stream in Washington.

It is stated (Sp. M. R. pp. 55-56):

"The testimony shows that as early as 1891 there was being irrigated from the Walla Walla River, through the Little Walla Walla River, within the State of Oregon something more than 2200 acres of land. (Stip. No. 3.) Whatever this amount of land was, the diversion of the water of the Walla Walla River at the Red Bridge was complete and continuous. The use may not have been as economical as modern irrigation methods, in a developed agricultural district, would indicate, but the fact remains that all of the water was taken and that it did not during the same period, return directly to the channel of the Walla Walla River through the Ford branch or the Crockett branch, which are the channels which would have conducted any excess diversion back into the main river." (Wash. Ex. 17, Or. Abs. pp. 3, 7, 33, 34, 42, 48.)

If, as we contend, the diversion of water by Oregon irrigators through these natural channels has been excessive and also has been used to satisfy rights in Oregon junior to rights below in Washington, there is no physical reason why the proper amount of water should not be permitted to flow down these natural channels to the Washington streams for use in Washington. Measurements of the lower Ford and lower Crockett branches

in the year 1933 revealed 25 c.f.s. of water flowing in the Crockett and 26 c.f.s. of water flowing in the Ford, making a combined capacity of these two branches of at least 50 c.f.s. (Wash. Nar. T. p. 89.)

(5) In substance the conclusion of the Special Master's report is that Oregon is entitled to the water of the main stream in Oregon and that Washington is entitled to the water of the Mill creek tributary. While the records of measurement of the annual flow are incomplete, the annual Mill creek flow may be estimated at from ⅓ to ⅔ of that of the main stream. If the proportional flow is taken in the summer months of July, August and September, it is about ⅓. The average total available summer water supply (July, August and September) in the related stream system, from all sources is about ⅓ in Washington and ⅔ in Oregon, while the proportion of acreage in each state irrigated from the stream system is about the reverse of that of the average available water supply. Washington with ⅔ the irrigated acreage has ⅓ the available water. While there are many elements to be taken into consideration in determining an equitable apportionment of water on an interstate stream, and the above may be regarded as suggestive only, the differences in the respective requirements of the two states and in the respective amounts of water available for each do not, in our view, render the apportionment suggested in the report equitable as between the two states. The fraction ¼ used in this exception is an error and should have been ⅓.

(6) Stream channels along the upper river are utilized in connection with the distribution of water in

Oregon. These are referred to in the exceptions as old abandoned stream channels. These channels are abandoned only in the sense that the river has abandoned them except in times of high water. They are natural stream channels. The loss in these channels is considerable. (Wash. Nar. T. pp. 12-16.)

It is believed that the loss of water in these natural channels in Oregon should be given consideration in determining the rights of the two states in the stream system.

(7) The maximum award of water per acre in the general Oregon decree (Wash. Ex. 1) is 1½ miner's inches (.0375 c.f.s.) per acre. There is also a further provision in the decree awarding additional water for small individual tracts. (Wash. Ex. 1 p. 90.) There is a provision in the decree, however, that the amount of water used shall not exceed the amount reasonably required for beneficial use. (Wash. Ex. 1 p. 90.)

While recognizing that vested rights in water in Oregon should be acknowledged, it is our view that the duty of water fixed as a maximum in the general decree was not vested beyond the amounts that could reasonably be beneficially used, in view of the provision in the decree limiting the awards to the amount reasonably required.

Water permits issued by the State Engineer of Oregon fix the duty of water at ½ a miner's inch per acre. (Wash. Ex. 10.) The use of water under these permits is in the same general locality as that under the decree. The official determination of the State Engineer on such matters, it appears to us, should be given great weight.

The Special Master's report, however, while dealing at length with the testimony of expert witnesses and of farmers who claimed to require the maximum allotment provided in the decree (Sp. M. R. pp. 75-100) apparently gave little consideration to the official determination of water duty for that locality by the State Engineer.

(8) A practice has been established in Oregon of permitting landowners below the place of use of water to use the excess or tail water from the ditches rather than to require the owner of the right to return the water to the ditch or natural stream. This is locally called "waste" water. In some instances, use of so-called waste water might be justifiable because it otherwise would go to waste. In the instant case, however, about 700 acres are using so-called waste water in the Milton-Freewater territory. (Wash. Nar. T. p. 15.)

The Special Master's report does not appear to have given the practice of using waste water any controlling weight in connection with the methods of water use in the related area in Oregon.

(9) The report of the Special Master with respect to the existence of 300 wells used for irrigation on the Milton-Freewater fan, after setting forth the substance of the testimony of Arthur M. Piper, a geologist employed by the United States Geological Survey as a specialist in the study of ground water (Sp. M. R. pp. 100-108), concludes that since the water pumped from the wells is used exclusively upon the tract of land on which the well is located, the use of the wells for irrigation may be sustained on the ground that the landowner

is using his well to recapture, in part at least, water previously used and lost in deep percolation. The doctrine of recapture will be considered later in this brief.

This exception relates to the question whether the depletion of the hydraulic head of the stream system in Oregon by the use of these wells is of sufficient consequence to receive consideration in determining the relative rights of the two states in the river.

During the period from April to September inclusive in the year 1932, 9010 acre feet were pumped from these wells. In the months of July and August of that year, approximately 45 c.f.s. were pumped from the wells and used for irrigation. (Wash. Ex. 18.) Washington's Exhibit 29 contains a tabulation of the locations and dates when dug of 80% of the wells used for irrigation in Oregon. This tabulation shows a progressive extension from year to year up to and including the year 1934 in the number of these wells.

The Special Master finds that there is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington. (Sp. M. R. p. 111.)

The aggregate amount of water drawn from these wells and used for irrigation equals approximately 30% of the average summer river channel supply of water in the river system in the related area, and it appears to us that the use of this amount of water from the acknowledged sources of the river supply is entitled to greater consideration in connection with the rights of the two states than that given it in the Special Master's report.

(10) As heretofore pointed out, the supply of water in the stream system is generally sufficient to satisfy all the substantial rights on the streams in the two states in the spring and, in years of abundant precipitation and favorable temperature, in the early summer. (Wash. Ex. 18 pp. 77-78.)

A substantial part of the water supply of the main stream has always been used by irrigators in the State of Washington. However, the claim of the State of Oregon is apparently that the use of water of the main stream in Washington is by sufferance only on the part of Oregon. The claim of Oregon in this regard is set forth in paragraph 1 of Stipulation No. 10 as follows:

"By appropriation, diversion and use the State of Oregon, its citizens and water users, have acquired by adverse use and prescription the right to the use of *all* or so much of the waters of the Walla Walla river and its tributaries flowing in Oregon as is required to supply the appropriations of the citizens and water users of said State according to the priorities and in the amounts and for the acreages as set forth in the decrees of the Courts of said State, and the permits issued by the State Engineer of said State; and said rights of said citizens and water users of said State are rights vested in the citizens and water users of the State of Oregon by said appropriation, diversion, adverse use and prescription without regard to any claim of right or diversion or use on the part of any lower diverter from said stream in the State of Washington, and are prior in time and superior in right to any claimed rights of the State of Washington, its citizens and water users."

The findings and conclusions in the Special Master's report, in approving Oregon's claim above set forth, by implication at least, deprives the State of Washington of any right to the waters of the main stream system in Oregon.

Aside from the question of the correctness of such findings and conclusions of the report, it would appear to us that it must be conceded that the State of Washington has some rights in the waters of the stream system in Oregon and that these rights should be more clearly defined than in the Special Master's report.

(11) The State of Oregon claims that the river system in Oregon should be considered, for the purposes of the instant case, as a state stream wholly in Oregon. The claim is set forth in Paragraph III of Stipulation No. 10 and in part is as follows:

"At all times from the beginning of irrigation in the State of Oregon, said State, its citizens and water users have distributed and used the waters of the Walla Walla river and its tributaries for irrigation, domestic, power and manufacturing purposes as a stream wholly in Oregon, separate and independent of any part thereof in the State of Washington, * * *."

The Walla Walla river and its tributaries constitute an interstate river system. Its only source of water supply is from the drainage of the North and South Forks, the main stream and small tributaries above the Oregon-Washington state line. (Wash. Nar. T. p. 235.) The drainage is continuous and natural stream channels cross the line from Oregon into Washington. The findings and conclusions in the report of the Special Master by implication approve the claim of the State of Oregon hereinabove in part set forth and it appears to us fails to give adequate consideration to the physical conditions which, in our view, make such a claim legally untenable.

(12) The correlated water supply of the various distributaries of the Walla Walla river in Oregon has been dealt with herein under sub-paragraph (4) of this title and will not be given further consideration at this place.

2.) In our view, the Special Master's report might have properly presented the evidence or conclusions therefrom more completely in some particulars which will be mentioned.

(1) While the fact that the physical conditions surrounding the source threads of Mill Creek in Oregon do not permit of feasible use of the waters of Mill Creek by Oregon has no substantial bearing on the issues of the case, it is mentioned in the exceptions as not included in the report in a review of Washington rights on Mill Creek. (Sp. M. R. p. 52.)

(2) It is believed that the conclusion in the Special Master's report that a more liberal supply of water should be available to the Oregon water users because of the "sporadic" character of the water supply of the river (Sp. M. R. p. 53) might properly have shown a completer review of the summer low water flow of the stream, which is fairly certain and constant. The character of the summer low water flow has been given consideration hereinabove.

(3) The statement in the Special Master's report (p. 63) "that during the period of high water the Washington users do not need to impinge upon the Oregon users" might be taken to mean that the high water supply of the Mill Creek tributaries is the only source

of the water used during that period in Washington. It is believed that the report might properly have shown that during that period the flow from the main stream and tributaries crossing the state line into Washington is made use of by Washington users.

The high water flow of the stream system is generally sufficient to satisfy all the substantial rights in both states and is not in controversy in the instant case except in so far as the conclusions in the report might be construed to award *all* the waters of the stream system in Oregon to the State of Oregon.

(4) It is believed that in considering the relationship of the Milton-Freewater Hudson Bay Irrigation Company of Oregon and the Walla Walla Irrigation Company of Washington and the question of notice of intention of the former company to take water of the Walla Walla river in Oregon, the report of the Special Master (Sp. M. R. pp. 63-64) would have given a truer picture of the situation had the report shown the common ownership and management of the two companies and the practice of the two companies with respect to winter irrigation. (Wash. Nar. T. p. 64, Ore. Abst. p. 23.)

(5) In dealing with the appropriation for the Gardena project in Washington, the report of the Special Master refers to the telegraphic demands by the State Supervisor of Hydraulics of the State of Washington upon the State Engineer of Oregon for water from the river system in Oregon for use in Washington (Wash. Exs. 24, 25 and 26) and states that the Gardena canal had been receiving 116 c.f.s. under a decree allowing it

but 66.67 c.f.s. and that on the day before the first telegram was sent, the Gardena canal was still receiving 68 c.f.s., an amount near its decreed right. It is also pointed out in the report that the Washington water master did not begin to regulate the Washington users in that year until June 10 and did not close all rights with priorities subsequent to 1892 (the priority of the Gardena right) until July 6th. (Sp. M. R. p. 66.)

It is believed that the report in dealing with this situation should also have called attention to the practice in both states of encouraging water users to begin diversions early in the season with the view of storing water in the soil to reduce to some extent the amount of water required in the low water period (Wash. Ex. 11, Ref. Rep. p. 5, Ore. Abst. p. 56), which would have shown the reason for the over-diversion of the Gardena canal in April of the year 1930. The report might further have shown in this connection that there had been a sudden drop in the river in April of that year (Wash. Nar. T. p. 39), but that a big rain occurred on June 2nd and relieved the situation so that rights with priorities subsequent to 1892 were not closed in Washington until July 6th.

(6) It is stated in substance in the report of the Special Master that the conduct of the manager of the Gardena project in attempting to secure the return sewage supply of the city of Walla Walla and in attempting to secure additional water by wells seems entirely inconsistent with the present claim made by the plaintiff state for water arising in the stream system in Oregon. (Sp. M. R. p. 69.) It is believed that the conclusion

stated in the report disregards the fact that during the period these attempts to secure additional water were being made a substantial part of the supply for the Gardena canal came from the streams crossing the state line from Oregon into Washington.

The Washington watermaster during the years 1917 to 1922 testified that during that period he had no authority to regulate the stream and that with the exception of the East Little Walla Walla river, the tributaries in Washington of the main stream contributed no water during the low water period and that all the supply that reached the point of the Gardena diversion came from the main stream and the East Little Walla Walla river. (Wash. Nar. T. pp. 60-61.)

(7) It is stated in substance in the Special Master's report that during the period after the recession of the high waters, none of the waters of the stream rising above the Red bridge were ever applied to beneficial use within the State of Washington. (Sp. M. R. p. 72.)

It is submitted that the primary source of all the waters in the main stream and other streams crossing the state line into Washington is above the Red bridge in Oregon (Wash. Nar. T. pp. 234-235) and it is believed that the statement in the report is too broad and that it fails to take into account the natural drainage of the river system.

(8) The Washington decree (Wash. Ex. 11) determining generally the relative rights of the Walla Walla river in Washington awards the Gardena project, which was at that time operated by the Walla Walla Irrigation

Company, a right for 7,000 acres, 2,000 acres of which was determined to be inchoate. (Wash. Ex. 11 p. 69.) The decree provides also that certain rights of a priority later in the schedule of rights generally than that of the Gardena project, involving 1,095 acres of land should nevertheless have a priority paramount to that of the Gardena right. This provision is inserted following the statement of the several rights involved under each class in the form of a footnote substantially in the following language:

"Note: Under the provisions of the decree in the case of the Lowden Company, et al., v. The Walla Walla Irrigation Company, records of this Court, all the above lands included in this class taking water from the Walla Walla River are entitled to a priority over the lands included in the claim of the Walla Walla Irrigation Company." (Wash. Ex. 11, pp. 72, 73, 74, 77, 78, 79.)

There is also a provision in the decree limiting the Gardena right to 66.67 c.f.s. during the period from April 1 to July 1 and to 50 c.f.s. from July 1 to October 1 in each year and 1 c.f.s. for each 50 acres of land for winter irrigation; but providing that the inchoate rights might be supplied as consummated. (Wash. Ex. 11 p. 72.)

This limitation providing for different allowances during different respective periods of the year is common to all rights adjudicated in the decree. A general provision similar in character applying to all rights is contained in paragraph 11 of the decree, page 146.

The reason for the limitation of the Gardena right because of the decree in the Lowden Company case is suggested in the Referee's report upon which the decree is based. Existing decrees, agreements and other complicating factors are discussed in the report as entering

into the formulation of a schedule of respective rights and it is stated among other things, that "associated with all these complications is the additional factor of the dual system of rights recognized as existing in this state." (Wash. Ex. 11, Ref. Rep. p. 6.) The reason that certain rights of a later priority generally are given priority over that of the Gardena project in the decree is due to these complications.

The reason for different water allowances in the decree in different periods of the year is also explained in the Referee's report. Among other things, it is stated:

"* * * that a portion of the water applied during the winter, spring and early summer, finds its way thru the soil and reappears in the form of springs or seepage in the lower channels, thus increasing the supply of water available for diversion to lower lands.

"The practice and custom of heavy irrigation during the flood period of the streams has continued for many years and has resulted in bringing under irrigation a considerably larger area than would be possible from the low water flow of the streams unaffected by this irrigation. For this reason it has been thought proper to recognize the beneficial effects to all concerned of heavy early irrigation and to fix for the early season a lower duty of water (that is, a higher rate of application) than during the late season." (Wash. Ex. 11, Ref. Rep. p. 5.)

It is stated in the Special Master's report (p. 67): "The Washington court decreed to Gardena a winter irrigation right of fifty second feet of water." This manifestly is a typographical error. As shown above, the winter right is 1 c.f.s. for each 50-acres of land.

In referring to the limitations of the Gardena right set out in the decree mentioned above, the Special Mas-

ter's report suggests that in fixing these limitations, the Washington court must have proceeded on the same theory as that adopted in the case of *U. S. v. Haga*, 276 Fed. 41, wherein it was held that upper water users on a stream which disappears should not be shut off for lower users on the reappearing water section of the stream where the upper stream makes no contribution during the irrigation season to the reappearing section of the stream. (Sp. M. R. pp. 72-73.)

The limitations of the Gardena right in the Washington decree, it appears to us, were prescribed for the reasons above given and cannot be predicated upon the theory of the *Haga* case as suggested in the Special Master's report.

(9) The Special Master's report asserts that during the low water period from the year 1892 to the date of this trial none of the waters of the Walla Walla river arising above the Red bridge in Oregon was ever used by the lands in the Gardena project and that during the high water season their rights have been adequately supplied by the Washington tributaries. (Sp. M. R. pp. 73-74.)

It appears to us that the record does not support this assertion. As heretofore pointed out, practically the only summer water which the Gardena canal diverted, until the Washington tributaries were regulated in 1929, was from the main stream and the Oregon tributaries entering the main stream above the canal. The source of supply was from Oregon. (Wash. Nar. T. pp. 60-61.) The superintendent of the project testified that the Gardena canal did not go dry at any time in the sum-

mer from 1917 up to the time he left the employ of the company in 1922. A landowner in the district corroborated this statement. (Wash. Nar. T. pp. 58, 64.)

The only Washington tributary of any consequence entering the main stream above the intake of the Gardena canal is Yellowhawk creek. (Wash. Ex. 17.) Measurements at the mouth of Yellowhawk creek were taken in the spring and summer months of 1932 and 1933. Measurements were also taken, during that period, of water entering the Gardena canal. On May 27, 1932, 42 c.f.s. were flowing from Yellowhawk creek into the main stream. (Wash. Ex. 18 p. 174.) On the same day 106 c.f.s. were being diverted into the Gardena canal, an excess of 64 c.f.s. over that being furnished by Yellowhawk creek. (Wash. Ex. 18 p. 11.) So far as the measurements show, at no time during the month of May in that year did the flow from Yellowhawk creek equal the amount of the diversion into the Gardena canal. These measurements further show that on no day in the months of June or July of that year did the flow from this tributary equal the diversion of the Gardena canal. (Wash. Ex. 18 pp. 11 and 174.) The measurements for the period from June 21 to July 31 in the year 1933 show that on no day during this period did the flow from Yellowhawk creek equal the diversion into the Gardena canal. (Wash. Ex. 18 pp. 12 and 175.) A substantial portion, if not all, the diversion of the Gardena canal during the periods covered by these measurements, over and above the supply from Yellowhawk creek, came through the stream system from Oregon.

(10) The statement in the Special Master's report that the Washington Court in the *Achermann* case

(Wash. Ex. 11) found that the use of water in Oregon was a benefit and not a detriment to Washington users (Sp. M. R. p. 74), in our view, is broader than justified by the finding of the referee in that case. The finding of the referee, as shown by the quotation thereof in the Special Master's report, was that the *early* use of water when the supply is usually *abundant*, along the Walla Walla river on the Oregon side of the state boundary line, is a benefit to lower lands later in the season. (Sp. M. R. p. 74-75.) Both the time and place of use in Oregon is limited in the referee's finding. (Wash. Ex. 11, Ref. Rep. p. 4.)

(11) The Special Master's report finds that neither by the evidence nor by the conduct of the appropriators is it shown that the appropriators of the Gardena right had intention to take and use the water then being diverted in Oregon (Sp. M. R. p. 75) and under the law and with due diligence to apply the same to beneficial use in Washington. (Sp. M. R. p. 75.)

The reasonable inference to be drawn from the record and the conduct of the appropriators, it would appear to us, is that the appropriators would not have undertaken and brought to completion a canal of that magnitude and distance to appropriate water from the Washington tributaries only, which the records show flow little water in the summer. The only rational explanation is that the appropriators intended to obtain water coming through the stream system from Oregon. As heretofore pointed out, water has been obtained from that source. It should be noted that the dates of the notices of appropriation for the Gardena project are

1891 and 1892 respectively, and not 1901 and 1902 as stated in the report. (Stipulation No. 5, Exhibits B. C & D.)

(12) The implication of the statement in the Special Master's report (p. 80) that "It is significant that notwithstanding the existence of No. 3 (low duty) lands along Mill Creek in Washington, the State of Washington called no practical irrigators to show that in their experience a lesser quantity of water than that claimed by the State of Oregon for similar lands is sufficient for the proper irrigation and maturity of crops" is that this type of soil is not being successfully farmed in the State of Washington on the high duty of water (.4 miner's inch or .01 c.f.s. per acre) provided for in the Washington decree. (Wash. Ex. 11.)

It should be noted that the Washington duty of water has not been challenged and put in issue in the instant case. The record, however, shows that the No. 3 soil area along Mill creek above the City of Walla Walla and along said creek below and along Stone creek and southwest of the city is extensively cultivated on the Washington duty of water. (Wash. Nar. T. pp. 171-172.)

(13) The Special Master's report finds that even on Washington's assumption that the 300 wells on the Milton-Freewater fan draw a substantial part of the stream supply in Oregon, the owners of the wells, which wells are located on their own respective lands, have the right to use them for irrigation under the doctrine of recapture. (Sp. M. R. p. 108.)

A comparison of descriptions of the lands on which the wells are located (Wash. Ex. 29) with the descriptions of the lands for which stream rights are awarded in the Oregon decree (Wash. Ex. 1) shows that in many instances the well owner's stream right is of later priority and is shut off during at least part of the summer. The doctrine of recapture, it appears to us, could not be invoked, in effect, to advance the priority of the stream right. *U. S. v. Ide*, (1924) 263 U. S. 497, 68 L. ed. 407, 44 S. Ct. 182.

3.) Report incomplete.

(1) The Special Master's report gives little attention to the diversions of water on the river above the canyon at Milton in Oregon. There is no effective regulation of the uses of water in this section of the stream (Ore. Abs. p. 52), although the practice there is wasteful.

Mr. Marvin Chase, a former State Hydraulic Engineer of the State of Washington, testifying for Washington, in substance described the irrigation practice in this part of the stream as follows:

In a stream of this character where the gradient is steep, there are many channels used during high water which are more or less dry during the low water. If water is carried in these for any considerable distance, it is a very wasteful method of diverting water from a stream for irrigation. The use of water for irrigation is detrimental to the lower reaches of the stream. Along the major portion of the Walla Walla river, some water returns from the irrigated land to the stream but in no instance is there as large an amount as what is taken out of the stream, and in no instance does it return to the stream in the later months in time to be of benefit to the lower users on the stream. Excess diversion in the upper reaches, is a very decided loss to the supply of the stream. In the upper reaches of the Walla Walla

river, there is fairly generaliy a wasteful use and a wasteful way of diverting the water. It is wasteful in the excessive amount which is diverted and placed on the land, in the method of diversion, the long by-channels or by-passes made, in the lack of diversion or controlling works and of measuring devices, and in the over-diversion of the amount necessary, allowing the surplus to flow down unused sloughs or channels, oftentimes dry, without returning it to the stream. I am speaking now of the territory from the town of Milton, including both forks of the stream, up to its source so far as irrigation is practiced along the stream. There is both an over-diversion and a wasteful method of diversion along the stream. By over-diversion, I mean that there is an amount diverted in a ditch in excess of that which can be beneficially used on the land or of that which is set out in their permit or decree. In this reach of the stream above Milton, there are very few ditches that have at this time any diversion works, and in nearly every instance, they are of a temporary and of a makeshift character. When I speak of highwater channels for the diversion of water, I mean that there is a brush and rock barrier placed in the stream later in the season when they wish to divert their water, and the water is turned into an old channel for considerable distance and lower down some headgate, diversion work or control is put into their ditch. In nearly every instance an excess amount of water is turned from the river into the particular dry channel or slough, and the excess part where there is a regulation or control, is merely turned on down the slough or only in a very few instances is it returned directly to the stream. That method of diversion results in an excessive transportation loss in this dry or high-water channel and also depletes the stream system proper. It increases the weathered area of the stream to a great extent and therefore adds to the transportation and evaporation loss. People want to use an excessive amount of water because it makes it unnecessary for them to perform as much labor in the diverting and *controlling* of their water and in the irrigating of their land. They make the excessive use of water do the service of the cost of labor and material. It would not be an excessive expense for these landowners up there to put in diversion works. They could use the

material at hand, which consists of logs and rocks, and put in diversion works as lasting as those that might be constructed in a more expensive way. The diversions in that part of the stream are mostly of individual landowners or the copartnership of a few. They are all comparatively small, I think, running probably up from only a part of a cubic foot per second of time to 14 or 15 c.f.s. (Wash. Nar. T. pp. 12-14.)

The measurements of the diversions of this section of the stream in the summer of 1933 showed generally that the diverters at that time were diverting about 50% in excess of their respective decreed rights. (Wash. Ex. 30, Table IV.)

It appears to us that the methods of diversion and of use of water in this section of the stream have a substantial bearing on the issues in the case and should receive more consideration than that given them in the Special Master's report.

(2) The Special Master's report gives no review of the evidence concerning the waste of water from the Milton ditch which diverts water from the river through an old river channel, a pipe line, an open ditch, another old river channel and finally an artificial channel running from three-quarters to a mile from the river to the measuring weir for the ditch. (Wash. Nar. T. pp. 14-15, 81-82, Ore. Abst. p. 54.) This ditch is used to irrigate over a section of land of which about 100 acres are watered from waste water from the ditch. (Wash. Ex. 1, Ore. Abst. p. 59.)

(3) Washington submitted the testimony of a number of witnesses to the effect that the summer supply of the streams running from the related area in Oregon across the state line into Washington in recent years

had diminished. These streams include the main stream of the Walla Walla river, the East Little Walla Walla river and the West Little Walla Walla river. (Wash. Nar. T., Barney p. 39, German p. 22, Hammer p. 24, Hartvedt p. 62, Ross p. 27, Ross p. 30.) The water measurements for the summer months in the years of 1932 and particularly of the year 1933, show a substantial increase in the supply of the stream in Oregon over former years (Wash. Nar. T. pp. 54-55 and 62-63), yet the testimony of these witnesses was that there had been no increase in the supply of these Washington streams coming from Oregon. The inference is clear, it appears to us, that the diminution of the supply in the Washington streams is due to an increased consumption of water above in Oregon.

(4) The record of the measurements of the summer diversions for the Gardena canal since 1928 (Wash. Ex. 18 pp. 11-21) do not fully reflect the amount of diminution of the supply of the East Little Walla Walla river and of the main stream above the Gardena intake caused, as we believe, by increased consumption of water in Oregon because of the inauguration of stream regulation in Washington in the year 1929. (Wash. Nar. T. p. 36.) As already pointed out, prior to 1929 practically no water was supplied to the main stream by the Mill creek tributaries during the summer. The supply then came from Oregon sources. After Washington regulation, the Mill creek tributaries were compelled to furnish water to the main stream in accordance with the relative priorities of rights on the stream system in Washington but Oregon users continued their increased consumption of water in the related area and the supply from that

source formerly enjoyed by the main stream was not restored. The Special Master's report fails to give this situation any significance.

4.) In the instant case the parties entered into stipulation No. 2 which, among other things, provides that the rights on Mud creek and its tributaries and on Pine creek and its tributaries are hereby established and shall be administered and the water shall be distributed to such rights in accordance with the decrees of the courts of the two states and the permits for the appropriation of water issued by authority of the two states, in the same manner as if the state line did not exist, and there are no issues herein in respect thereto.

It appears to us that the effect of this stipulation should not be abrogated by a dismissal of the cause and that a decree should be authorized herein incorporating the provisions of this stipulation. Mud and Pine creeks and their respective tributaries are interstate streams furnishing water for over 4,000 acres of decreed rights in addition to a considerable acreage of permit rights, situated in the two states. (Wash. Exs. 2, 3, 4, 8 and 11.)

5.) The Special Master's report, in dealing with the appropriation of the Gardena project, sets out certain sections of the Washington statute relating to appropriation of water, in force at the time the Gardena right was initiated. (Sp. M. R. p. 67.) Then follows a discussion of the doctrine of appropriation in which it is pointed out that the posting and filing of the statutory notice in itself does not constitute an appropriation but that the posting and filing of the notice must be followed by reasonable diligence in consummating the appropriation. (Sp. M. R. pp. 67-72.) The statement in the re-

port, of essentials of a valid appropriation required under the Washington statute in force at that time is substantially correct. The statute referred to, however, is not exclusive. A valid appropriation might be made at that time irrespective of the statute.

The practical effect of the statute was to extend the doctrine of relation. Without the statute, the priority of the appropriator's right became effective as of the time the first work was done on the ground to initiate the right. Under the statute, the priority of the right became effective as of the date the notice was posted and filed. The work had to be prosecuted with diligence by the appropriator in either case. Under the statute, the diligence required was that prescribed by the statute. Without the statute, the diligence required was that generally recognized by the customs of the time and the decisions of the courts relating to the subject.

There was no law in force in Washington at that time requiring the appropriator to elect whether to proceed under the statute in consummating an appropriation. He might proceed under both forms of procedure and upon consummation of his right he was entitled to the benefits of either with which he had complied. If he failed to comply with the statutory method, he was not entitled to the statutory priority date but to a priority date as of the beginning of actual construction work.

In the instant case, a notice was filed in February, 1892. Actual construction work was begun in August, 1892. (Stipulation No. 5 pp. 2-3.) The water of the river was first diverted into the canal in 1893. (Stipulation No. 5 p. 7.) The only effect of failure to comply with

the statute would be to postpone the priority date from February to August, 1892.

The doctrine of relation recognized in the State of Washington entitles the appropriator to a priority date as of the time of the beginning of the actual work on the diversion works, provided the work has finally been consummated with reasonable diligence.

Wash. Ex. 11, Gardena right p. 69;

*In Re Crab Creek & Moses Lake,* (1925) 134 Wash. 7, 11, 235 P. 37;

*In Re Alpowa Creek,* (1924) 129 Wash. 9, 14, 224 P. 29.

It is believed that the character of the appropriation of the Gardena right should have been given fuller consideration in the Special Master's report.

6.) In our view, the evidence challenging the priority and legality of the Gardena right, submitted by Oregon over the objection of the State of Washington was erroneously received and accepted by the Special Master in determining the rights of the two states in the instant case. The question will be considered later in this brief.

7.) The exceptions mentioned in sub-paragraphs (1) to (7), both inclusive, relating to findings in the summary of findings contained in the Special Master's report, have been generally heretofore considered in this brief and discussion of them specifically will not be repeated at this place.

(II.)

As to Legal Conclusions

1.) We are in accord with the first legal conclusion set out in the Special Master's report, to-wit: that this Court has jurisdiction of this controversy as a controversy between two states to determine the rights of the parties to the use of the waters of an interstate stream. (Sp. M. R. p. 114.)

2.) The second legal conclusion in the report in substance is that the Gardena project under its appropriation is not entitled to any of the water of the Walla Walla river arising above the Red bridge, because:

(a) Since 1880, the Oregon users have diverted and used such water without protest on the part of Washington users unt. 1930.

(b) None of such water has been put to a beneficial use during the irrigation season under the Gardena filing.

(c) If the Gardena appropriators ever had any intention of appropriating such water, such intention was abandoned before the commencement of this action.

(d) Over a period of forty years, the Gardena appropriators have recognized the right of the Oregon appropriators to use all of such waters during the irrigation season.

This legal conclusion is excepted to for a number of reasons set out in the complainant's exceptions, which will be more fully considered later herein.

3.) The third legal conclusion in the Special Master's report, to which exception is taken, is that the State

of Oregon and its appropriators are not diverting and using more of the waters of the Walla Walla river than their equitable proportion thereof. This legal conclusion will receive further consideration later herein.

(III.)

AS TO RECOMMENDATIONS FOR A DECREE

The Special Master's report recommends that a decree be entered herein dismissing complainant's bill of complaint.

The complainant's exceptions to this recommedation will receive consideration later in this brief.

*2. Summary of Complainant's Contentions*

It is thought appropriate at this place to set out briefly a summary of the complainant's contentions with respect to the principal issues involved in the instant case.

(I.)

JURISDICTION

*1.) A Controversy Between States*

The jurisdiction of the Supreme Court of the United States is invoked in this case under authority of section 2 of article 3 of the Federal Constitution extending the powers of that tribunal to controversies between states in the Union and in accordance with the rule announced in the case of *Kansas v. Colorado* (1906), 206 U. S. 46, 51 L. ed. 956, 27 Sup. Ct. Rep. 665; (1902) 185 U. S. 125, 46 L. ed. 838, 22 Sup. Ct. Rep. 552, construing section 2 of said article 3 to include controversies between states

over the water rights on interstate streams. See also in this connection:

*Wyoming v. Colorado* (1924), 259 U. S. 419, 66 L. ed. 999, 42 Sup. Ct. Rep. 552; (1931) 286 U. S. 494, 76 L. ed. 1245, 52 Sup. Ct. Rep. 621;

*Arizona v. California* (1931), 283 U. S. 423, 75 L. ed. 1154, 51 Sup. Ct. Rep. 522;

*Connecticut v. Massachusetts* (1931), 282 U. S. 660, 75 L. ed. 602, 51 Sup. Ct. Rep. 286;

*New Jersey v. New York* (1931), 283 U. S. 336, 75 L. ed. 1104, 51 Sup. Ct. Rep. 478;

*Wisconsin v. Illinois* (1930), 278 U. S. 367, 73 L. ed. 426, 49 Sup. Ct. Rep. 163; 281 U. S. 179, 74 L. ed. 799, 50 Sup. Ct. Rep. 266;

*North Dakota v. Minnesota* (1923), 263 U. S. 365, 68 L. ed. 342, 44 Sup. Ct. Rep. 138.

This is a suit by the State of Washington for an injury to it in its capacity of quasi-sovereign. In that capacity the State has an interest independent of and behind the titles and private rights of its citizens, in and to the waters of the Walla Walla river stream system.

*Georgia v. Tennessee Copper Co.* (1907), 206 U. S. 230, 237, 51 L. ed. 1038, 1044, 27 Sup. Ct. Rep. 618, 11 Ann. Cas. 488;

*Kentucky v. Indiana* (1930), 281 U. S. 163, 74 L. ed. 784, 50 Sup. Ct. Rep. 275.

*2.) Past and Present Injuries Involved*

The injuries being complained of by the State of Washington in the instant action are those alleged to have been previously received and to be now continuing to be sustained. The issues arising out of the controversy between the complainant and the defendant have received full consideration by the representatives and officials of the two states, resulting in a partial settlement evidenced by stipulation No. 2 and in a limitation

of the issues involved evidenced by the other stipulations on file in the cause. The controversy has reduced itself to the remaining issues shown in the pleadings and in said stipulations, which issues cannot be reconciled at this time by voluntary convention between the states. The court is asked to settle the same.

## (II.)

### Rules of Decision Applicable Herein

#### *1.) Equitable Apportionment*

In original actions involving controversies between states over water rights on interstate streams, the United States Supreme Court appears to have established and applied the rule of equitable apportionment of the use of such waters. *Kansas v. Colorado, supra; Wyoming v. Colorado, supra; Connecticut v. Massachusetts, supra,* and *New Jersey v. New York, supra.*

In this connection, Justice Holmes states in the *New Jersey* case cited above:

"We are met at the outset by the question what rule is to be applied. It is established that a more liberal answer may be given than in a controversy between neighbors members of a single state. Connecticut v. Massachusetts, February 24, 1931 (282 U. S. 660, ante, 297, 51 S. Ct. 286). Different considerations come in when we are dealing with independent sovereigns having to regard the welfare of the whole population and when the alternative to settlement is war. In a less degree, perhaps, the same is true of the quasi sovereignties bound together in the Union. A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it. New York has the physical power to cut off all the water within its jurisdiction. But clearly the exercise of such a power to the destruction of the interest of lower states could not be tolerated. And on

the other hand equally little could New Jersey be permitted to require New York to give up its power altogether in order that the river might come down to it undiminished. Both states have real and substantial interests in the river that must be reconciled as best they may be. The different traditions and practices in different parts of the country may lead to varying results but the effort always is to secure an equitable apportionment without quibbling over formulas."

In making an application of the rule of equitable apportionment to the facts involved in a particular case, the United States Supreme Court is not limited to the rules of municipal law. Justice Butler observes in the *Connecticut* case above cited:

"For the decision of suits between states, federal, state and international law is considered and applied by this court as the exigencies of the particular case may require. The determination of the relative rights of contending states in respect of the use of streams flowing through them does not depend upon the same consideration and is not governed by the same rules of law that are applied in such states for the solution of similar questions of private right. *Kansas v. Colorado,* 185 U. S. 125, 146, 46 L. ed. 838, 22 S. Ct. 552. And, while the municipal law relating to like questions between individuals is to be taken into account, it is not to be deemed to have controlling weight. As was shown in *Kansas v. Colorado,* 206 U. S. 46, 100, 51 L. ed, 956, 975, 27 S. Ct. 655, such disputes are to be settled on the basis of equality of right. But this is not to say that there must be an equal division of the waters of an interstate stream among the states through which it flows. It means that the principles of right and equity shall be applied having regard to the 'equal level or plan on which all the states stand, in point of power and right, under our constitutional system,' and that, upon a consideration of the pertinent laws of the contending states and all other relevant facts, this court will determine what is an equitable apportionment of the use of such waters. *Wyoming v. Colorado,* 259 U. S. 419, 465, 470, 66 L. ed. 999, 1013, 1015, 42 S. Ct. 552.

"The development of what Mr. Justice Brewer, speaking for the court in *Kansas v. Colorado,* 206 U. S. 46, 98, 51 L. ed. 956, 27 S. Ct. 655, refers to as interstate common law, is indicated and its application for the ascertainment of the relative rights of states in respect of interstate waters is illustrated by *Missouri v. Illinois,* 200 U. S. 496, 50 L. ed. 572, 26 S. Ct. 268; *Kansas v. Colorado,* supra; *Wyoming v. Colorado,* 259 U. S. 419, 465, 470, 66 L. ed. 999, 1013, 1015, 42 S. Ct. 552, supra, and *Wisconsin v. Illinois,* 278 U. S. 367, 73 L. ed. 426, 49 S. Ct. 163, 281 U. S. 179, 74 L. ed. 799, 50 S. Ct. 266 * * *."

*2.) Doctrine of Appropriation*

In the *Wyoming* case above cited, the court made the doctrine of appropriation the basis of its decision of the relative rights of the States of Wyoming and Colorado to the waters of the Laramie river, the doctrine of appropriation being the foundation of private water rights in both states. Two corporations, acting under the authority and permission of the State of Colorado, were proceeding to divert the waters of the river for a right junior in time to many of the rights on the river in Wyoming, when the State of Wyoming instituted an original proceeding in the United States Supreme Court against the State of Colorado to prevent the proposed diversion. The Laramie rises in Colorado and flows down across Wyoming to the North Platte river, of which it is a tributary. The court determined the available dependable supply of the stream, calculated the priorities in Wyoming senior to the proposed Colorado diversion, fixed the water requirements of the Wyoming senior rights, deducted the aggregate amount thereof from the available dependable supply and established the amount of the supply remaining as the amount to which the Colorado appropriators were entitled for the proposed diver-

sion. Rights in Wyoming junior to the proposed Colorado diversion were not included within the injunctive provisions of the decree.

We believe that the principle of the *Wyoming* case might properly be applied in the instant case. The individual water rights involved in both states are based on the doctrine of appropriation. The injunctive provisions of the decree in the *Wyoming* case, while directed to the State of Colorado, involved the diversion for one project only. The individual rights involved in the instant case are many. The principle applicable, however, is the same in both cases. The condition of many individual rights in the instant case, does not, in our view, present any great practical difficulties either in the application of a decree based on the principles of the *Wyoming* case, to all the rights included therein measured on a constant flow basis, or in the enforcement of such a decree.

In speaking of the law applicable to the division of waters of interstate streams, the Special Master's report refers to the *New Jersey-New York*, the *Connecticut-Massachusetts*, the *Kansas-Colorado*, and the *Wyoming-Colorado* cases as applicable to the instant case. With respect to the decision in the *Wyoming- Colorado* case, it is stated (p. 49):

"The rule adopted in the *Wyoming-Colorado* case as to priorities is not one of law, but one of equity. Under the conditions existing in that case such rule was applied as the measure best adapted to work out the equities between the parties."

With reference to the decision in the *Kansas-Colorado* case, it is stated (p. 49):

"Speaking in *Kansas v. Colorado*, this court says: 'We must consider the effect of what has been done upon the conditions in the respective states and so adjust the dispute upon the basis of equality of rights as to secure as far as possible to Colorado the benefits of irrigation without depriving Kansas of the like beneficial effects of a flowing stream.' 206 U. S. 100, 109.

"In the case of *Kansas v. Colorado*, above cited, after having tabulated the growth in poulation, cultivation and production which had accrued to the State of Colorado by virtue of the use of the waters involved in the controversy, the court uses this language:

" 'Whatever has been effective in bringing about this development is certainly entitled to recognition, and should not be wantonly or unnecessarily destroyed or interfered with. That this development is largely owing to irrigation is something of which, from a consideration of the testimony there can be no reasonable doubt. It has been a prime factor in securing this result, and before, at the instance, of a sister state, this effective cause of Colorado's development is destroyed or materially interfered with, it should be clear that such sister state has not merely some technical right, but also a right with a corresponding benefit.' id. 109.

" 'It cannot be denied, in view of all the testimony (for that which we have quoted is but a sample of much more bearing upon the question), that the diminution of the flow of water in the river by the irrigation of Colorado has worked some detriment to the southwestern part of Kansas, and yet, when we compare the amount of this detriment with the great benefit which has obviously resulted to the counties in Colorado, it would seem that equality of right and equity between two states forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation.' id. 113. "

The substance of the rule announced in these several decisions referred to in the Special Master's report, if we understand it correctly, is that the relation of the

states in the Union to each other under our constitutional system is one of equality of right; that this equality when applied to the relative rights of two states in an interstate stream does not necessarily mean an equal division of the waters of the stream but an equitable apportionment of the benefits of the river which the states concerned are capable of receiving from a reasonable use of the waters of the stream; that if division of the waters of the stream on an appropriation priority basis, will, in the judgment of the Court, result in an equitable apportionment of such benefits as between the states concerned, the rule of the *Wyoming-Colorado* case may be applied by this Court in original actions between the states.

The citizens and water users of the States of Oregon and Washington have for a number of years used the waters of the Walla Walla river system and have received the benefits of such use in their respective states. Out of this use and from these benefits, prosperous communities have developed. This development in the usual course began in a limited way and gradually progressed with benefit to both states until its demands for water exceeded the dependable water supply of the river system. Thereafter the supply of water for additional use became limited and an increased benefit from further additional use on one side of the state line became an increased injury on the other.

From the beginning of irrigation in this valley, there has always been a substantial supply of water coming down through the river system from Oregon for the use of irrigators in the State of Washington. The supply

of water in the spring of the year has been generous but has gradually lessened to and through the summer to a supply in the Washington section of the main stream which has been relatively small but nevertheless substantial. In more recent years the increased consumption of the supply in Oregon has reduced the flow of water from Oregon into the related area on the Washington side of the state line to a very small amount. The situation has been aggravated by a cycle of dry years culminating in the year 1926. (Ore. Abs. p. 100.) With the stream supply returning more nearly to normal, however, the former amounts of water coming through the stream system from Oregon during the spring and summer months and which was formerly available for the use of Washington irrigators has not been restored to the stream.

Washington testimony is to the effect that at least from the year 1907 to the year 1924 there was water in the main stream throughout the summer for irrigation. (Wash. Nar. T. p. 52.) The evidence is that this supply came largely through the river system from Oregon. (Wash. Nar. T. p. 61.) This testimony is corroborated by the records of the measurements of the Gardena diversions during the years 1917, 1918 and 1919, which show a continuous supply of water in the main stream at that point during the spring and summer months. (Wash. Ex. 18 pp. 13-18.) In recent years the supply in the main stream in Washington has been very limited, notwithstanding the fact that since the inauguration of stream regulation in Washington, Yellowhawk creek has been required to furnish a supply to the main stream. (Wash. Nar. T. p. 36.)

The result has been that farmers along the East Little Walla Walla river in Washington in some instances have been compelled to limit or discontinue irrigation (Wash. Nar. T. pp. 24, 28, 32) and the farmers in the Gardena project have suffered a reduction in crop yields. (Wash. Nar. T. p. 57.)

This shortage of water in the main stream in Washington during the summer months in recent years has been substantially contributed to, in our view, by increased consumption or loss of water in Oregon. It is brought about by lack of proper regulation, increased irrigation in the spring and early summer, great transportation losses, extensive use of wells and practices of this kind which reduce the hydraulic head of the stream system in Oregon and lessen the supply coming through the system into the main stream in Washington during the summer months.

This conclusion is corroborated by an examination of the records of stream measurements. In the year 1919, the summer mean supply of the stream near the forks in Oregon was 129 c.f.s. (*Supra,* Statement 3. (e).) In the summer of that year, without any contribution from Yellowhawk creek, there was continuously sufficient water in the main stream to permit an average diversion for the Gardena project of 13 c.f.s. throughout the summer (Wash. Ex. 18 pp. 17-18) while in the year 1933, with a mean summer flow in the upper river of 122 c.f.s. (Wash. Ex. 18 pp. 55 and 63), a year of substantially better water supply, there was no water in the main stream—even with the Yellowhawk creek supply added —for use of the Gardena project during the month of September. (Wash. Ex. 18 p. 12.) The same was true

in September, 1932 (Wash. Ex. 18 p. 11), however, with a lesser stream supply in Oregon (mean summer supply in upper river of 121 c.f.s.—*Supra,* Statement 3. (e)).

With a limited summer supply of water in the stream system in Washington, the irrigators in this state have had to make greater than ordinary use of the spring and early summer supply for soil storage purposes, which together with selection of appropriate crop types, enables the farmers to mature crops successfully on a very limited summer supply of water. The late spring, early summer and summer supply, such as it is, however, is of great importance and in many instances determines the difference between success or failure in crop production.

It is the benefits from the use of this supply of the river system which Washington is seeking to have equitably apportioned so far as Oregon is concerned. The State of Washington is not seeking in this action water upon which the substantial development of the Milton-Freewater area in Oregon is founded and upon which the essentials of its present prosperity now rest.

We are not impressed with the view that Oregon is entitled to a monopoly of the stream supply in that state without any obligation to the State of Washington and its citizens with respect to this interstate stream. We do not believe that a *monopoly* of the stream supply is essential to the development on the Oregon side of the state line. Somewhere in this stream supply a point is reached where the requirements of Washington and its citizens make a legitimate claim to a reasonable share of the water above that point.

It is believed that a consideration of the stream supply in its relation to the relative priorities of the rights by appropriation in each state can be given which will preserve for the State of Oregon and its water users their rights to the equitable benefits from the stream system and at the same time assure to the State of Washington and its water users a reasonable share of the late spring, early summer and summer supply of the stream. In our view, this result can be accomplished by an application of the rules announced in the *Wyoming- Colorado* case, *supra.*

(III.)

SPECIFIC ISSUES TENDERED

*1.) Priority of Gardena Farms District's Right*

(1) This right has become vested under the laws and constitutions of the United States and of the State of Washington and cannot be collaterally attacked in this suit by the State of Oregon.

By decree in the Superior Court of the State of Washington for the county of Walla Walla, in the case of *State of Washington, plaintiff, v. Charles Achermann et al., defendants,* No. 19075, the Walla Walla Irrigation Company, under Proof No. 570, was given a right from the Walla Walla river, by appropriation under a priority date of 1892, to irrigate 7,000 acres of land with a maximum amount of water of 93.333 c.f.s. from April 1st to July 1st, and 70 c.f.s. of water from July 1st to October 1st, subject to the following note:

"The claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the ref-

eree, to-wit: on the 29th day of March, 1926, is entitled to use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st; 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said lands may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics."

In the year 1928, an irrigation district was formed, known as the Gardena Farms district, which acquired the rights of the Walla Walla Irrigation Company.

Under date of April 17, 1931, a certificate of water right setting forth the substance of the rights awarded in the decree was issued to the district by the State Supervisor of Hydraulics in accordance with the provisions of Section 26 of the State Water Code (Chap. 1 of Title 48, Vol. 8, Remington's Revised Statutes of Washington, annotated, Chap. 117, Laws of Washington for 1917 and amendments.)

The decree above mentioned was rendered and entered in proceedings instituted by the State Supervisor of Hydraulics to determine the relative rights to the waters of the stream in question under the provisions of Section 14 of said Code. (See page 1 of the Report of the Referee included in Washington Exhibit 11.)

The State of Oregon challenges the priority date of the Gardena right because of an alleged lack of dili-

gence, and of an alleged change of intention, on the part of the original appropriators and their successors in interest, and contends that the several lands now irrigated from this appropriation are entitled to a priority date only as of the year in which each respective tract was first irrigated and that lands not yet irrigated are entitled to no water right. The general claim of vested rights, adverse use and estoppel made against all Washington rights applies to this right also.

The claim of vested rights, adverse use, etc., will be considered under that head later in the brief and will be disregarded here.

The State of Washington contends that the rights of the Gardena Farms district are as set forth in the Referee's report and said decree (Washington Exhibit 11) and in the certificate of water right (Exhibit A in Stipulation No. 5) and that the priority of this right under the admitted facts relating thereto is not an issue in this case.

It must be admitted that the Walla Walla river is an interstate stream; that at the time the Gardena appropriation was initiated many of the lands along the stream system above were public lands of the United States; that a large area in the upper reaches of the stream is now a part of the Umatilla National Forest Reserve (Stipulation No. 11, Jan. 14, 1934); that the right of appropriation has, at all times, been recognized and protected by the customs, laws and courts of both states; that in 1892 the predecessors in interest of the Gardena Farms district initiated a right to use the waters of the Walla Walla river for beneficial purposes;

that the court of the State of Washington and the state's administrative officials have recognized this right and have established its validity so far as the State of Washington is concerned. Under this state of facts, the right is valid and cannot be successfully challenged by the State of Oregon, in this action.

It is a well-established rule of law, that the validity of an appropriation is governed by the laws of the state where the appropriation is made. The rule is well stated in an annotation in 66 L. ed. U. S. 999 as follows:

"It is held that one who has acquired a right to water of an interstate stream by prior appropriation in accordance with the laws of the state where it is made, is protected in such right as against subsequent appropriators, although the latter withdraw the water within the limits of a different state." Citing:

*Howell v. Johnson* (1898), 89 Fed. 556;
*Hoge v. Eaton* (1905), 135 Fed. 411;
*Anderson v. Bassman* (1905), 140 Fed. 14;
*Rickey Land & Cattle Co. v. Miller & Lux* (1907), 152 Fed. 11, affirmed in 54 L. ed. 1032, 218 U. S. 1032;
*Morris v. Bean* (1906), 146 Fed. 423, affirmed (1908) 159 Fed. 651, affirmed in (1911) 221 U. S. 485, 55 L. ed. 821, 31 Sup. Ct. Rep. 703;
*Conant v. Deep Creek & C. Valley Irr. Co.* (1901), 23 Utah 627, 90 Am. St. R. 721, 66 Pac. 188.

See Kinney on Irrigation & Water Rights (2nd Ed.) Vol. 3, Sec. 1227, page 2222, where the rule is stated and discussed with sustaining citations.

Moreover, a water right by appropriation so acquired, and recognized by the state where the appropriation is made, is valid and enforceable under the constitution and laws of the United States.

The acts of Congress of July 26, 1866, and of July 9, 1870, combined in Section 661, Title 43, U. S. C. A., is as follows:

"Section 661. *Appropriation of waters on public lands; right of way for canals and ditches.* Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed; but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

"All patents granted, or preemption or homesteads allowed, shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights, as may have been acquired under or recognized by this section. (R. S., Secs. 2339, 2340.)"

In applying the Federal statute above quoted to the rights of lower appropriators in Wyoming as against upper appropriators in Montana on an interstate stream flowing from Montana into Wyoming, the court in the case of *Howell v. Johnson et al.* (1898), 89 Fed. 556, held that the rights of the lower appropriators in Wyoming did not rest upon the laws of Wyoming but upon the laws of Congress.

See

*Hoge et al. v. Eaton et al.* (1905), 136 Fed. 411;
*Weiland v. Pioneer Irr. Co.* (1921), 259 U. S. 498, 66 L. ed. 1027.

In Stipulation No. 6, which defined the issues be-

tween the two states with respect to the Gardena right, the State of Washington challenged the legal sufficiency of each of the grounds of contest of this right by Oregon, as constituting a defense or as sustaining any rights of the State of Oregon in this action. (Stipulation No. 6, Par. V.)

At the time evidence was submitted by Oregon before the Special Master against the Gardena right, the State of Washington objected to the introduction of such evidence as not material or relevant to the issues involved herein, for the reasons hereinabove set out, which reasons were at that time specified to the Special Master. The objection was noted and the evidence received by the Special Master subject to the objection. (Wash. Nar. T. p. 258.)

While the Special Master does not specifically rule on the objection in his report, he cites a number of cases supporting the conclusion that "no state can legislate for or impose its own policy upon another state nor can the decrees entered in one state have any binding effect upon persons who were not parties thereto." (Sp. M. R. p. 50.)

It was conceded that Oregon and its citizens were not parties to the Washington suit in which the decree adjudicating the Gardena right was entered. The right, however, had vested and accrued and had been recognized and acknowledged by the local customs, laws and the decision of court and it appeared to us that the same was protected by the Acts of Congress of July 26, 1866, and of July 9, 1870, above mentioned.

(2) The record herein affirmatively establishes the

validity of the appropriation of the Gardena Farms district.

The State of Oregon questions the reasonable diligence with which the Gardena appropriation has been consummated and contends that the doctrine of relation does not apply to the extent of entitling the right to a priority date of 1892.

It should be noted at the outset that reasonable diligence is a relative term. As stated in Kinney on Irrigation & Water Rights (2nd Ed.), Vol. 2, Sec. 735, page 1269:

"As has been said, the law does not require any unusual or extraordinary efforts, but it does require that which is usual, ordinary, and reasonable. The diligence required in the prosecution of the construction of all works necessary for the diversion and application of water in an attempted appropriation of the same is that constancy or steadfastness of purpose or labor which is usual with men engaged in like enterprises, and who desire a speedy accomplishment of their designs. There must be such assiduity in the prosecution of the works as will manifest to the whole a *bona fide* intention to complete it within a reasonable time. As to what constitutes diligence is a question of fact and must be determined from all the circumstances surrounding each particular case."

The doctrine of appropriation in the western states grew up largely in the use of water for mining purposes. In the case of mining operations, the amount of water necessary for the objects of the appropriation was fully provided for from the beginning. The use of water for irrigation, however, introduced a new feature in the doctrine because of the practical condition in such cases that the appropriation is made largely for future needs. These needs must be anticipated in a measure and pro-

vided for in advance by the construction of ample works. This transfers a heavy financial burden upon the appropriator in many instances from a point where the financial returns of the enterprise are available to a point in advance of these returns and enters into the time consumed in consummating the appropriation. The rate of progress with which the appropriation is consummated for irrigation purposes, therefore, depends upon many things which were unknown to the miners when they originated and developed the doctrine of appropriation.

In determining reasonable diligence, the courts take into consideration, among other things, the objects and purposes of the appropriation; the climate and topography of the country where the appropriation is made and where the works are to be or have been constructed; the water available and the present and future demands for the products resulting from the appropriation; the general financial conditions of the times in which the appropriation is being or has been consummated and the magnitude of the works themselves. Where the amount of the appropriation is obvious and there is manifested a constant purpose to consummate the same accompanied with continued efforts and expenditures of money in its behalf, consistent with the magnitude of the project and with the public demand for the products of its accomplishment, it may generally be said that reasonable diligence in the prosecution of the appropriation has been shown.

The supreme court of the State of Washington, in dealing with this question in connection with a farm appropriation, applies what it terms the rule of common sense. In the case of *In re Alpowa Creek* (1924), 129

Wash. 9, 224 Pac. 29, arising under determination proceedings of the Water Code, the court observed (14):

"As to what may be considered reasonable diligence in putting appropriated waters to a beneficial use must depend to a large extent upon circumstances. The lands in question are sparsely settled and located far from any trade centers. The creek is small and its water insufficient for all purposes. The country in the vicinity has, because of its character and remoteness from civilization, developed very slowly. Yet, under all of these adverse conditions, some irrigation has been carried on from an early date by means of the Houser ditch, and the amount of that irrigation has gradually but surely increased. A part of the waters have at all times been used for other beneficial purposes, such as milling and mining. The law does not require an immediate use. The doctrine of common sense applies. In making the appropriation intention is an important factor. All the appropriated water need not be at once used. Reasonable diligence in making a beneficial use is all that is required.

" 'Appropriation of water consists in the intention, accompanied by reasonable diligence, to use the water for the purposes originally contemplated at the time of its diversion.' *Offield v. Ish*, 21 Wash. 227, 57 Pac. 809."

The rule of common sense applied to the Gardena appropriation should, it is believed, resolve the question of diligence in favor of the appropriators. The object of irrigating several thousand acres of sage brush lands 25 miles distant from the point of diversion was an unusual one in that day. The transportation of large volumes of water over long distances for irrigation purposes was not common at that time. The great development of irrigation projects has taken place since. The National Reclamation Act was not passed until 1902. U. S. C. A., Title 43, Sec. 391, page 305. The first comprehensive state water codes were not adopted until 1903 and later. Wiel, Water Rights in the Western States

(2nd Ed.), Sec. 25. The Gardena project was a pioneering conception involving many unknown factors. As shown in the agreed statement of facts (Stipulation No. 5), the canal was 16 feet wide on the bottom from the diversion point for a distance of several miles. Fills had to be made over physical depressions. Cuts were made through the hills. Two were 26 feet deep at the deepest points, one about 1500 feet in length, the other about 1000 feet in length. There were breaks and slides. This was a gravity canal. An idea of the contour of the country through which it passed may be gathered from an examination of the canal's course on the official map, Washington Exhibit 17,—it was a rolling country of light and ashy soil. All this excavation and soil filling work was done by teams and scrapers furnished largely through the efforts of one man. The progress of this work exended through the great national financial crisis of 1893 and the demands for lands and water and the general income therefrom were influenced by these conditions. Actual construction was begun in August, 1892, and continued in varying degrees from year to year until 1905, when the canal was completed to the project. While the records of the company in the name of which the work was carried on are not complete, such records as are available show a continued expenditure of money every year for construction purposes from the year 1897 to the date of completion of the canal in 1905 to the extent of nearly a hundred thousand dollars. There has been a progressive improvement of the canal and of the distribution facilities of the project since that time until today the district has a fully equipped up-to-date system. (W. Brief Nar. T. pp. 52, 62.) Under these cir-

cumstances, we believe that the superior court of the State of Washington and the State Hydraulic Engineer, as its referee, in the case of *State v. Achermann et al.*, were fully justified in finding, as presumably they did in sustaining this appropriation, that the same was prosecuted with reasonable diligence.

The Special Master's report deals with the question of diligence under the State of Washington in force at the time the Gardena right was initiated. (Sp. M. R. p. 67.) The right of appropriation irrespective of the statute has heretofore been considered under the Review of Complainant's Exceptions (I), (5) and such consideration will not here be repeated.

The State of Oregon further alleges in stipulation No. 6 that the original intention of the appropriators was to irrigate only such lands in the Gardena territory as might be irrigated by a gravity canal, without any siphons, running into Oregon substantially along the course of the so-called original survey shown on Oregon Exhibit 35; that in 1904 the appropriator changed the original intention and began the construction of a shorter canal with siphon across Pine creek valley direct to the territory to be reclaimed and made possible the irrigation of about 1,800 acres in addition to that contemplated in the original plan (Oregon Exhibit 39 tabulates the acreage as 1,675.6); and that the priority date of the rights for these additional lands should not be earlier than the year 1904.

The substance of the position of the State of Oregon with respect to "intention" is that a change in the means by which the initiated appropriation was to be

accomplished constitutes a change of the intention to appropriate the water. This is not necessarily the case.

The general rule in this connection is stated in Wiel, Water Rights in the Western States (2nd Ed.), Section 177, page 280, as follows:

"Sec. 177. *The Right is Independent of the Mode of Enjoyment.*—By appropriating a stream the law has always considered that a right of property was conferred, and being property, the owner may enjoy it as he will, so long as he does no injury to others, just as he may a farm or a horse or other property. The law, hence, has always regarded the right as independent of means or place or purpose of use or of point of diversion. * * *"

Again the same authority states (Sec. 179, page 285):

"Sec. 179. *Change of Means of Use.*—It has been said that the appropriator may use the water in any manner necessary to carry out the use for which it was appropriated. In all branches of the law of waters it is immaterial whether the use is in steam boilers, by hydraulic rams, in flumes or pipes, or appliances of whatever kind. The means of use may be changed so long as no one is injured in making the change. That is, the priority is not lost; and whether the change can be made rests on whether the acts done in making it would be lawful under the general law, if done in any other connection."

Kinney on Irrigation and Water Rights (2nd Ed.), Vol. 2, Sec. 825, page 1449, makes the following statement regarding the rule:

"All that is necessary to make a valid appropriation is that there be an actual diversion of the water from the natural channel or other source of supply, with an intent to apply it to some beneficial use, followed by an actual application of the water either to the use designed or to some other within a reasonable time, and

any lawful means toward attaining that end may be used."

In the instant case the Gardena canal with a capacity of 150 c.f.s. for considerable length was constructed. It was constructed that size from the beginning in 1892 (Stipulation No. 5). Assuming transportation loss in the canal of 12.7%, the amount of loss now sustained in the canal (W. Brief Nar. T. p. 237), the canal would have a capacity to deliver 131 c.f.s. of water—sufficient to irrigate 13,000 acres of land at the duty of water judicially established for irrigation in Washington. The notices of appropriation state that the lands to be irrigated by the appropriation are situated in the locality of the lands now irrigated by the canal (Stipulation No. 5, Exhibits "B," "C," and "D"). The record shows conciusively that it was the intention of the original appropriators and of their successors in interest to divert 150 c.f.s. of the waters of the Walla Walla river at the diversion point used, for the irrigation of lands in the locality of the present Gardena project. That intention has never been changed, modified or abandoned. Every survey made, every piece of construction work done was made or done with that object in view. Whether that object was accomplished by hand labor, horse power or mechanical contrivances of various kinds, whether by a canal constructed around the hills or through them, whether by a canal partly or all earthen, wooden flumed or siphonal, whether by ownership of the lands themselves or by sale of water to others, whether by delivery of water to some of these lands or to other of these lands, to part of the same or to all of them—these things, it appears to us, are incidental and not controlling matters

bearing on the validity of the Gardena appropriation or its priority. The referee and the court presumably so concluded, in the Walla Walla river adjudication case in the Superior Court of the State of Washington.

In the Special Master's report it is concluded that if the predecessors in interest of the Gardena Farms district ever had any intention to appropriate water of the Walla Walla river arising above the Red bridge, such intention was abandoned before the commencement of this action. (Sp. M. R. pp. 114-115.) We have herein before endeavored to show that such waters have been used each year by this project under the title, Review of Exceptions (I), 2., (9) and we shall not repeat the discussion here.

It is submitted that the appropriation of the Gardena Farms district and its priority as set forth in Washington's Exhibit 11, p. 69, should be accepted in this suit as a valid and vested water right.

### 2.) Water Requirements

#### *(1) Differences in Aggregate Water Use Between the Two States*

The aggregate amounts of water diverted from the Walla Walla river system to satisfy consumptive rights under the general decree in Oregon (Washington Exhibit 1) including uses on all classes of soils, during the summer season of 1933, averaged 1 c.f.s. for each unit of 26 acres. (Wash. Nar. T. p. 102.) The amount of water diverted to satisfy the consumptive rights under the general decree in Washington (Washington Exhibit 11) including use on all classes of soils, during the same year, averaged 1 c.f.s. for each unit of 95 acres. (Wash.

Nar. T. p. 100.) This difference in the general average water requirement for the related lands in the two states for the year 1933, while slightly varying possibly in degree in different years, is typical of the difference in amounts of water distribution in the related area in the respective states.

It should be noted, however, that the area in Oregon including the lands between the fan and the state line, the Milton-Freewater fan and the lands along the upper river, involves soil approximately 66⅔% low water duty, while in Washington the area including upper Mill creek, the Mill creek fan and the lands in the related area below Mill creek, not including Gardena, involves soil roughly 20% low water duty.

In recent years the available supply of water in the stream system in Washington during the summer season has generally been insufficient to satisfy priorities up to 1892 (Wash. Ex. 27), while in Oregon in the year 1933, priorities up to and including 1909, with the exception of the Milton-Freewater Hudson Bay Company right, generally had water and in addition waste and stream ground waters were generously used during the summer season in that territory. (Wash. Nar. T. p. 102.)

*(2) Differences in Regulation of Water Use Between the Two States*

In the State of Oregon, water is often first diverted from the main stream in old river channels to the private ditches, and in many instances measurements are made at considerable distances from the main stream. (Wash. Nar. T. p. 15.) The right of Oregon diverters

to transport water through natural channels is not questioned but in determining the relative rights of the two states in and to the waters of the stream system, the upper diverters in deference to the rights below should be accountable to the main stream for a reasonable amount of the losses resulting to it from this general method of diversion.

The natural channels in the State of Washington from which diversions are made are living streams and excess waters therein run unobstructedly down the stream for the use of lower diverters. In the State of Oregon, excess waters diverted from the main stream through high water or old river channels, are generally not returned to the main stream, but are used excessively by the respective diverters on the channels or are allowed to waste for the use of those having no stream rights whatsoever—a result again detrimental to the water supply of the main stream for the rightful use of lower diverters thereon.

Measuring weirs are in use over the entire system in the State of Washington (Washington Exhibit 11); divisional or proportional weirs are the typical form over the system in the State of Oregon. (Ore. Abs. p. 54.) Under the operation of these respective types of measuring devices, excess waters remain in the natural streams for lower users in Washington but are diverted proportionally therefrom by the water users in the State of Oregon. Thus again, the Oregon method of measurement tends to injure the water supply of the natural stream system.

In the State of Washington, all diversions on the stream system are under regulation in the summer sea-

son. (Wash. Nar. T. p. 36.) Diversions for 536.45 acres of land above the West's bridge on the main stream in Oregon, diverting at the estimated average diversion duty of one second-foot for 19 acres (Wash. Ex. 30, Table IV), are without practical regulation during the summer season. (Wash. Nar. T. p. 219, Oregon Ex. 45.) Waste water in some instances and water pumped from wells in all instances, in the related area in Oregon, are also without regulation. The limitation of regulation in Oregon tends to decrease the available stream supply for lower users in Washington at the season of the year when the demands on the stream are most critical.

### *(3) Farm Practices*

The Oregon farmers divert through earthen ditches and distribute the water over the land, without any water saving devices other than such care as is taken of the ditches. (Wash. Nar. T. p. 160.) There appear to be no check gates in these ditches and in some of them where the fall is excessive, the banks are undercut. (Wash. Nar. T. p. 188.) No devices to control the head of water entering the irrigation furrows are in use other than temporary earth fills put in with the shovel at each irrigation. The irrigation runs are comparatively long, not less than 18 to 20 rods. (Wash. Nar. T. p. 211.) In some instances they are 600 feet long. (Wash. Nar. T. p. 165.) In some instances they are approximately 660 feet long but irrigated in two sections of about equal length, by means of a cross pick-up ditch. The furrows in the upper half are used first in groups of 8 or 10 and the tail water therefrom running in the pick-up ditch is

used in the furrows in groups of 3 to 5 in the lower half of the tract. (Wash. Nar. T. p. 211.) This plan in reality utilizes 8 to 10 delivery ditches to water the lower groups of furrows. The furrows are generally about 3 feet apart except in the orchards where the center furrow between the tree rows is sometimes omitted. (Wash. Nar. T. p. 213.) The irrigation furrows in some instances are made with an ordinary mole-board plow, rather than a shovel plow. (Wash. Nar. T. p. 194.) Cover crops are frequently grown in the orchards. (Wash. Nar. T. p. 244.) The furrows apparently are not cultivated between irrigations in connection with root crops. (Wash. Nar. T. p. 195.)

In sections in Oregon where rotation is practiced, irrigation frequency is about once a week for the orchard crops and every third day for tomato crops. (Wash. Nar T. p. 240.) Water use is rotated on orchard lands in groups including as high as 50 to 60 acres; and on tomato lands in groups of about 20 acres. (Wash. Nar. T. p. 222.)

### *(4) Farm Requirements*

On the fan in the Milton-Freewater territory, the soil is underlaid with gravel 8 to 10 feet in depth resting upon which is locally termed cement gravel (Wash Nar. T. p. 210) which runs down to bedrock lying some three hundred or four hundred feet beneath the surface. (Wash. Nar. T. p. 226.) The upper three feet of the soil is gravel and boulders with fine soil between, the top 18 inches to two feet being filled with fairly heavy soil. (Wash. Nar. T. p. 184.) The fan was hydraulically made and is composed of rock and silt brought down by the

river. There is no sand on the watershed. The finer particles washed down on the fan are composed of a loam or clay nature. (Wash. Nar. T. p. 14.) The upper 18 inches to 2 feet of the soil on the fan is reasonably fertile, subs well and is not exceedingly porous. (Wash. Nar. T. p. 187.)

In Oregon the farmers above the West's Bridge on the main stream use such amounts of water as their respective conveniences may dictate, and is of the average diversion duty, as we have heretofore stated, of 1 c.f.s. for 19 acres, involving roughly 500 acres of land with priorities of 1892 and earlier; the farmers along the East Prong and Spring Branches have the use of such water as is available up to 1½ miner's inches (.0375 c.f.s.) per acre (Wash. Ex. 1), involving roughly 500 acres of land with 1892 and earlier priorities; the farmers on the fan in the Milton-Freewater territory have the use of 1½ miner's inches (.0375 c.f.s.) per acre (Wash. Ex. 1), involving roughly 1500 acres of land with priorities of 1892 and earlier; the farmers on the West Prong have the use of a general average of approximately 1 miner's inch (.025 c.f.s.) per acre. The decree (Wash. Ex. 9) awards specific amounts for each tract of land on the West Prong varying from ½ to 1¼ miner's inches per acre; the acreage with 1893 and earlier priorities is roughly 545. (Stipulation No. 3, Nov. 10, 1933.)

The testimony of some of the Oregon witnesses was to the effect that 1½ miner's inches (.0375 c.f.s.) per acre is not required for the lands along the said East Prong and Spring branches. (Wash. Nar. T. p. 247.) The soil of most of the land in this territory requires less water

than on the fan above. (Wash. Nar. T. p. 245, Wash. Ex. 15.)

The acreage along the West Prong in Oregon with priorities of 1892 and earlier is relatively small. The aggregate of the differences between the water requirements fixed in the decree (Wash. Ex. 9) and that contended for by Washington is relatively smaller. For comparison of the relative amounts of use of water in the two states, therefore, the State of Washington, accepts the duty of water fixed in said Washington Exhibit 9.

The amounts of water used on the fan in the Milton-Freewater territory and on the lands along the stream above, we believe to be larger than necessary. The Oregon farmers concerned are interested parties and their testimony should be considered in that light. As stated by Mr. Johnston, witness for the State of Washington (Wash. Nar. T. p. 194):

"As I said a short time ago, a farmer will usually not adopt better methods as long as he has an unlimited water supply. He will substitute the extra water for other improvement which might be more profitable."

The testimony of the Oregon farmer witnesses was in substance that they were using about 1½ miner's inches of water and could use more. There was no testimony to the effect that any great efforts had been made to get along successfully with less water. The testimony with respect to the use of well water was to the effect that it is used in some instances to get a larger head of water (Wash. Nar. T. p. 213); well water is also used to supplement stream rights of later priority.

The testimony of the expert witnesses agreed substantially as to the character of the soil on the fan. There was also a substantial agreement as to the moisture retained in the upper three feet of the soil after an irrigation. There was a difference of opinion as to the amount of water required for each irrigation to supply the moisture capacity of the soil, Mr. Larson, for Washington, testifying that 4 acre-inches were sufficient, and Dr. Powers, for Oregon, that 5 acre-inches were required. (Wash. Nar. T. pp. 168, 239.) Dr. Powers' opinion, however, appears to have been based on the assumption that no moisture was carried over in the soil from one irrigation to another. There was also a difference of opinion among the experts as to the frequency of irrigation necessary, Mr. Larson, for Washington, testifying that a frequency of 8 to 10 days is sufficient, and Dr. Powers, for Oregon, that once a week is required for orchards and twice a week for tomatoes. (Wash. Nar. T. pp. 169, 240.) The experts agreed that there was danger of loss of water during irrigation from deep percolation. The opinion of the Washington experts was that excessive loss from deep percolation might be prevented by careful irrigation practice (Wash. Nar. T. pp. 168, 199) while the Oregon experts were of the opinion that great loss from this cause would result in any event (Wash. Nar. T. pp. 239, 244.) It appears to us that the Oregon experts did not give full attention to the character of the soil in the root zone.

It is believed that the record does not show the care on the part of Oregon water users that might properly be exercised to prevent waste of water. If we assume a rotating group of 50 acres for orchards, with 1½

miner's inches per acre, the owner of a 10-acre orchard would have an irrigating head of 75 miner's inches less whatever the ditch transportation loss might be. If this loss were 20%, the irrigator would have an irrigating head of 60 miner's inches. If this head of water were applied in group rills approximating 1/15th of the tract irrigated, in accordance with the practice of Elba Rogers as a typical example (Wash. Nar. T. p. 210), the irrigating head for the 10-acre tract would be at the rate of 90 miner's inches an acre. One and one-half miner's inches of water per acre applied in the same manner with the same allowance for ditch loss, on a 4-acre tomato tract in a rotating group of 20 acres would give an irrigating head applicable at the same rate of 90 miner's inches an acre. The use of this head of water in the manner disclosed by the record results in excessive losses.

*(5) Findings in Special Master's Report on Water Requirements*

The Special Master's report finds that (pp. 113-114):

"The use of water by the Irrigators within the State of Oregon is not unduly wasteful but is, under the circumstances, a reasonable, beneficial and necessary use."

"The users within the State of Oregon have not diverted or used water in excess of their necessities or in excess of the amounts decreed to them under the Oregon decrees."

As we have heretofore endeavored to point out, we believe that the State of Washington and its citizens, are making a more careful use generally of the waters of the stream system than Oregon and its citizens, not only in the matter of individual apportionment but also in the matter of the methods of transportation and distri-

bution of water. The complainant has excepted to these findings in the report and submits that the record herein warrants a fuller consideration of the higher use of water in Washington in determining the equities of the two states in their relative rights to the use of the waters of the stream than that given it in the report.

### .3.) Wells

#### *(1) Injure Surface Stream Supply*

About 9000 acre-feet of water for irrigation is pumped from approximately 300 wells in Oregon during the irrigation season. (Wash. Nar. T. p. 123.) As heretofore pointed out, this draft of water during July and August in the year 1932 amounted to 45 c.f.s. or nearly a third of the average summer river channel supply in that area in Oregon. These wells tap the underground water supplying the river system in Oregon and the main stream below during the low water period. (Wash. Nar. T. p. 235.) A large number of these wells are located on the Milton-Freewater fan in the related area. The use of these wells for irrigation is a use of the water of the stream system and to an appreciable extent reduces its supply.

Mr. Piper, who made a study of ground water in this area at the request of both states, testified in substance, with respect to the general character of the water table in this area, that the ground water coming from the canyon at the apex of the Milton-Freewater fan is retarded by the fan and first travels radially outward through the fan (Ore. Abs. p. 70) but the remnants of the old formations of more or less impervious materials projecting from the westward and from the northwest-

ward, tend to restrict the flow of ground water to the west (Wash. Nar. T. pp. 229-230), and deflect it toward the north so that the direction of the natural flow of the ground water under the fan is generally along with and toward the river to the north. (Wash. Ex. 16, Plate 5.)

The depth of the water table from the surface of the fan grows progressively deeper during the summer (Wash. Ex. 16, p. 78) and the gradient is generally steep toward the north varying from but corresponding somewhat with the surface gradient of 60 feet to the mile. (Wash. Nar. T. p. 231, Wash. Ex. 16—Figure 4, p. 67.)

Changes in the level of the water table are often independent of the use of the wells. (Ore. Abs. pp. 71-72.) But the pumping from these wells for irrigation is a large item in the disposal of ground water (Wash. Ex. 16, p. 96) and does have some effect on the level of the ground water table. (Wash. Ex. 16, p. 65, Ore. Abs. p. 73.)

The natural destination of the ground water is the river to the north. However, the use of the wells lifts the water from its natural underground course and spreads it upon the surface where the part that is not consumed tends to follow the surface drainage slope to the westward away from the main stream directly to the northeast and north and returns it below the principal Washington diversions on the main stream.

Mr. Piper testified in part on this point:

"It is my judgment from that, therefore, that the general pattern of ground water circulation is a natural one, modified partly, perhaps, by irrigation water and by pumping, but not to a major extent. Our data does not permit saying to what extent." (Wash. Nar. T. p. 234, Sp. M. Original Transcript of Tes. Vol. 6, p. 798;

we do not find support in the record for statement in Ore. Abs. p. 75 "we cannot conclude that the pumping distributes the water further to the west" and assume it is an error.)

The result of pumping for irrigation in this area is that the Washington diverters are deprived of a substantial portion of the summer stream supply. With the gradual increase in the number of these wells, the effect has become definitely apparent in recent years.

Formerly, as heretofore pointed out, the summer supply of water in the main stream and in the East Little Walla Walla river was greater than at the present. Part of this diminution of supply, in our view, is due to the use of wells. In recent years, the supply of water in the streams to the west of the fan crossing into Washington has become noticeably greater. The Washington water master, speaking of Oregon tributaries entering the main stream in Washington, testified (Wash. Nar. T. p. 39):

"There has been a tendency for the supply of water in the streams and distributaries to the east to be less during the summer while those to the west down in the Pine Creek (region) have had a greater supply."

The reasonable inference to be drawn from this condition, in our view, is that the increased supply of water in these more westerly tributaries is due in part at least to the lifting of the ground water to the surface where a substantial portion of it follows the surface drainage toward the west and northwest.

It is our view that the owners of these wells in this locality are in reality diverting the stream supply for which an account should be taken in determining the equities of the two states in the stream system involved.

*(2) Rule Undecided by Courts in the Two States*

There has been no court decision in either the State of Oregon or the State of Washington directly applicable to this situation. There are court decisions in the two states relative to fugitive percolating waters having an unknown destination. These decisions have no application to this situation. The ground water admittedly comes from the stream system through the narrow gap above and is traveling through the Milton-Freewater territory toward a definite destination on its way to the stream system below. It is not fugitive percolating water headed for unknown destinations. It came from the stream. It is traveling temporarily along with and toward the stream and eventually reaches it again. It constitutes a substantial part of the surface stream supply and is simply an incident thereto.

The only case in the State of Washington having any bearing on the question involved here, which we have found, is that of *Meyer v. Tacoma Light and Water Company* (1894), 8 Wash. 144, 35 Pac. 601. The suit was instituted by riparian owners operating a mill at the outlet of a lake which was part of a non-navigable stream. The stream above and flowing into the lake was known as Clover creek, which flowed water on the surface only during the high water period. The whole watershed of the stream had an underlying impervious stratum covered by a deposit of gravel of varying depth. The trend of this impervious stratum from each side of the stream was in general towards the bed thereof. The ground water in the valley of the stream was not in any way confined except by the confines of the valley itself and there was no evidence except by inference that the

ground water reached the lake or contributed to the supply of the stream at the outlet of the lake during the low water period. The defendant power company, a non-riparian user, diverted the water of Clover creek and the plaintiffs, mill owners, sought to obtain damages resulting from the diversion of the power company on the theory that the whole watershed should be considered the bed of the stream and that they (the plaintiffs) as riparian owners were entitled to the undiminished flow thereof in accordance with the common law doctrine of riparian rights. The court on appeal held that the plaintiffs failed to show that they had sustained any damage by reason of the diversion and remanded the cause to the lower court for dismissal.

While the decision in the *Meyer* case is an authority on the question of damages only, the court made some observations in the opinion which are of interest in connection with the wells in the instant case. The court observes (147):

"That which has given rise to difficulty and much diversity among the authorities is as to the application of the rule. Some of the courts have held that the flow can only be protected when in a solid body like a stream on the surface, while others have applied the rule with greater liberality, and have afforded protection to the lower riparian proprietor when the underground stream was not so well defined. But so far as we have been able to discover, none of the cases have gone so far as to hold that he would be thus protected as to water which was percolating through sand or gravel within limits not at all defined by anything appearing upon the surface or made to appear by investigation beneath the surface. Counsel for plaintiffs insist that the proofs were sufficient to authorize a finding that the water in question was so flowing as to be entitled to protection.

"The proof in regard thereto established this state of facts: That the whole valley or watershed of the stream

had an underlying impervious stratum; that such stratum was covered by a deposit of gravel of varying depth; that the trend of this impervious stratum from each side of the stream was in general towards the bed thereof. Upon these facts plaintiffs contend that this whole watershed should be considered as the bed of the stream, and that since the water which, higher up the stream, was flowing upon the surface could not get below this impervious stratum, it must, when under the surface, continue to form a stream within defined limits. There is nothing in the proofs in any manner tending to show that the water was confined to a space immediately below or near the actual bed of the stream upon the surface of the ground, hence the contention of plaintiffs can only be sustained by holding that the entire valley through which it flowed constituted the bed of the stream. No case has been cited that would justify such a ruling.

"It has never been held that a flow of water percolating through the sand and gravel of the hillsides which lead down to the bed of the stream will be protected on account of the fact that such waters are confined to the valley to which such hillsides descend, and of which they form a part, by some underlying stratum below which the waters cannot go. If it had been shown by the proofs that the water all remained upon the surface until it arrived at a defined point, and then all disappeared, the conclusion might follow that it still retained its position as a stream confined to a point substantially identical with the bed upon the surface. But no such fact was in any manner made to appear. There was nothing to warrant any other conclusion than that the water spread itself through the gravel under and on each side of the stream, with no other boundaries than the underlying stratum of which we have spoken. There is nothing to at all indicate where or how within such boundaries the flow is continued. It may have appeared by inference that the waters, or a portion of them, eventually reached the lake, but there was nothing to show that they so reached the lake in any other manner than by percolation through the entire gravel bed of the valley of the stream."

In the observations quoted, the Court distinguishes between percolating waters unconfined and those re-

stricted to an area contributing to the surface stream supply above the place of use where the injury is alleged to have arisen. While this case is interesting in showing the mental attitude of the members of the Court, the decision has no controlling weight on the question involved in the instant case.

The recent case of *Evans v. Seattle*, (July, 1935) 82 Wash. Adv. Dec. p. 382, 47 P. 2nd 984, deals with percolating waters gathering in a natural sump where no natural stream is involved and is not applicable to the situation here.

The status of the decisions of the Oregon Court on ground water is equally unsettled. We have found no case in point in that jurisdiction. The case of *Hayes v. Adams*, (1923) 109 Ore. 51, 218 Pac. 933, in dealing with percolating waters supporting a spring, announces the rule that the user of the spring is entitled to protection of the percolation. The spring was located near the mouth of a deep canyon containing many wet, boggy places with rushes and other vegetation growing along the bank. The defendants tapped the percolating water some 400 feet above the spring on their own land by means of a pipe line and deprived the spring of its flow. The owners of the spring sought to enjoin the defendants from tapping the percolating waters and the defense was that the course of these waters was unknown and therefore they were part of the land and belonged to the owners thereof. The Court held that these ground waters were part of a water course, the existence and location of which were known or reasonably ascertainable, from the surface without excavation. The decision

in this case is not controlling in connection with the wells in the instant case but is interesting in that it announces the rule that percolating waters confined within the limits there existing contributing to the stream supply, and ascertainable by the existence of vegetation on the surface, are a part of the stream.

The State of Oregon passed an act in 1927 authorizing the appropriation of all underground waters in Eastern Oregon, lying east of the summit of the Cascade Mountains. Appropriations were recorded in substantially the same manner as appropriations of surface water under the Oregon water code. The statute saved existing rights in ground water. (Gen. Laws of Ore. 1927, chap. 410.) An amendment to this law in 1933 limits appropriations to underground streams, channels, artesian basins, reservoirs or lakes, the boundaries of which may reasonably be ascertained (Gen. Laws of Ore. 1933, chap. 263).

The boundaries of the ground water flow along the Walla Walla River and beneath the surface of the Milton-Freewater fair are reasonably ascertainable. It is doubtful, however, if such water comes within the statute. But, in any event, diverters from the surface streams are, in our view, entitled to have the ground waters directly supporting the stream supply protected in times of water scarcity.

*(3) Apparent Conflict of Authority in Other States*

There is an extensive annotation on percolating waters in Volume 55, A. L. R., beginning at page 1385. We shall make no attempt to analyze the digests of the

decisions there contained. While there is an apparent conflict in the decisions of the courts of the various states on the question, there is not so great a conflict on the principle involved. The conflict arises in the differences in facts and in the manner of proof submitted. Where the facts exist and are properly proved that the percolating waters are a substantial source of the surface stream supply, and the use of the percolating water complained of taps that supply, the courts generally seek to protect the surface stream supply.

The tendency of the earlier cases to avoid granting definite relief arises in many instances out of the indefiniteness of the proof submitted. The situation is well stated in Wiel, Water Rights in the Western States (2nd Ed.), Section 356, page 541:

"A third class of underground water similar to the sub-flow, but distinguishable from it, consists of percolations tributary to a watercourse instead of resting beneath it. While the sub-flow is a component of the stream resting beneath the bed, the tributary percolations form a component though they have not yet reached the actual channel.

"On the surface a stream is traced back so far as proof shows approaching water to be tributary, such approaching water being a component part of the watercourse. The watercourse extends back into lakes, creeks, springs that are its surface source or tributaries. Further back than that the state of geological knowledge did not, until comparatively recent years, furnish proof; and consequently the law, which can never advance beyond the proof, stopped also. The spring or other surface source was regarded as the vanishing point of the watercourse, and the percolations underground were an unknown quantity, too precarious in their movements in the then state of knowledge of the subject to be taken into consideration, and such percolations were treated under the rule of ownership of the soil in which they were found, as later set forth. The leading cases were

*Acton v. Blundell* and *Chasemore v. Richards*, in the former percolations tributary to springs, in the latter percolations tributary to the River Wandle. Such, also, were most of the earlier California cases dealing with percolating water. In all these cases the percolations were treated as a separate matter from the spring or watercourse and subject to a different rule of ownership.

"But more recent scientific investigation has dispelled most of this mystery concerning the movement of underground water. It is demonstrated fairly well now that there is an underground circulation near the surface (technically, the 'Vadose' circulation), beginning with rainwaters on the summit of a watershed and substantially making its way underground to lower levels until it finally reaches the sea, finding its way by percolation to a large extent into the channels of some watercourse in this downward travel. Taken too literally, this would make all percolations tributary to watercourses, but for the purpose of any individual case that inference is too remote, and the question is instead one of proximateness on the proof. If, on the proof, the percolations are shown to be tributary to the spring or watercourse in a material degree, the loss of them causing a substantial diminution of the spring or watercourse, they are now treated as a component part of the watercourse, and follow rights on the watercourse, and rights therein are not regarded as underground rights separate therefrom."

See also Kinney on Irrigation and Water Rights (2nd Ed.), Vol. 2, Sec. 1194.

*(4) Percolating Waters Once Part of the Surface Stream*

In the instant case, however, as we view the facts, the use of the wells for irrigation does not alone intercept percolating waters on their way to the stream but percolating waters which were once part of the stream above the canyon have percolated therefrom and are on their return journey to the stream. The rule applicable

in such case, in our view, is that applicable to the use of the waters within the channels of the stream.

The rule of reasonable use on the land of the person whose use is complained of which applies where the percolating water is on its first voyage to the stream is based on the theory that any other rule would discourage the ownership and development of lands adjoining stream courses and ofttimes interfere with necessary and valuable improvements. The reason for the rule, however, does not apply where the percolating water was once a part of the stream above and veers temporarily away from the stream on its downward course, and where the use on user's land reaches the proportions, as here, of nearly a third of the river channel supply in that area. This ground water is so related to the stream system that it partakes of an interstate character and should be given adequate consideration in determining the relative rights of the two states in the waters of the stream.

*(5) Finding in Special Master's Report Relative to Wells*

It is found in the Special Master's report (p. 111):

"In addition to the surface water available for use within the State of Oregon, the farmers have tapped the sub-surface water supply by sinking about three hundred wells, from which wells they pump each year approximately 9000 acre feet of water. The water so pumped is used upon the lands where the several wells are located.

"There is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington."

The complainant has excepted to this finding on the ground that it is not sustained by the law or the evidence.

(Complainant's Exceptions pp. 19-20.) For reasons hereinabove stated, it is believed that the use of 300 wells for irrigation to the extent shown by the record results in an injury to the stream supply available for Washington irrigators and is an element entering into the equities between the states in this action.

4.) Apportionment of Stream Supply

The stream supply is sufficient to satisfy rights with priorities up to 1891 in both states. There are approximately 10,500 acres in the related area in Washington with rights of 1892 and earlier priority. (Stipulation No. 3, p. 11.) There are approximately 2,600 acres in the related area in Oregon with rights of 1892 and earlier priority. (Stipulation No. 3, p. 11.) It requires approximately 115 c.f.s. to satisfy rights up to that priority, including the consumptive uses of the City of Walla Walla in Washington at the duty of water fixed in the Washington decree. (Wash. Ex. 11.) As heretofore shown, the average estimated summer supply of the stream system in Washington is 86 c.f.s., leaving a shortage in Washington for the satisfaction of the priorities of 1892 and earlier of 29 c.f.s. It requires approximately 110 c.f.s. to satisfy rights up to that priority, including the consumptive uses of the City of Milton and transportation losses usually allowed in Oregon at the maximum duty of water provided for in the Oregon decree. (Wash. Ex. 1.) As heretofore shown, the average estimated summer supply of the stream system in Oregon is 146 c.f.s., leaving a surplus in Oregon after the satisfaction of the priorities of 1892 and earlier in Oregon. The amount of this surplus depends upon the duty of water

to be used by Oregon. The rate above calculated is the maximum allowed by the Oregon decree. The surplus will vary according to the precipitation of the season but there will always be a surplus over the requirements of rights up to and including the Oregon 1892 priorities.

It is believed that this surplus should be apportioned first to the satisfaction of 1892 rights in Washington and that any remainder should be apportioned between the two states pro ratably in proportion to the amount of subsequent priorities in the respective states the remainder will satisfy beginning with the 1893 priority. Washington may receive the Oregon distribution through the main stream and through the East and West Prongs and Spring Branches and their connecting streams crossing the state line into Washington, by measurement at appropriate points thereon at the state line.

5. Adverse Use, Estoppel, Vested Rights, Tum-a-Lum River, and Separate Administration in Oregon

The complainant has heretofore filed its motion to strike affirmative defenses on adverse use, estoppel and vested rights, set up in the defendant's answer to the Bill of Complaint and this court has reserved its ruling thereon until submission of the cause to the court for final determination. The rights of the complainant under this motion have been reserved in stipulation No. 10, defining the issues on this phase of the case. (Stipulation No. 10, paragraph V, p. 8.)

*(1) The Doctrines of Adverse Use and Estoppel Inappropriate for the Determination of Relative Rights of States in An Interstate Stream*

It is believed that the strict doctrines of private adverse use and estoppel are inapplicable to the facts in

the instant case. Some of the elements necessary to be proved to sustain private rights by adverse use are lacking in such a situation as we have here. Private rights by adverse use are individual. A court of equity does not recognize group rights by adverse use. They cannot be acquired wholesale. One, or more, of the elements of hostility, notoriety, uninterruption, exclusiveness, and legality of use, is always lacking in a general use of water by numerous persons in ever varying extent, and during constantly changing periods of time.

The record here is that water in varying quantities has continuously run through the stream system from Oregon into Washington. The natural drainage is in that direction and there is no other source of stream supply (Wash. Nar. T. p. 235). From the beginning of irrigation there has been a progressive increase in the use of the water of the stream from year to year in both states (Wash. Exs. 1, 11). Oregon points to the diverting of the water of the main stream through the Little Walla Walla river in Oregon as constituting appropriation of all the water of the stream hostile to the State of Washington and its citizens. This division of the water is into a natural channel which again divides into other natural channels of the river system. As we have heretofore shown herein, the division of the supply of the stream at this point could not legally have initiated an appropriation of that amount of water, in any event, until in recent years for the reason that a beneficial use of that amount of water could not have been made on the number of acres of land under irrigation.

Moreover, the relative individual rights in the stream system have not been definitely known until recently.

The General Washington decree (Wash. Ex. 11) was not entered until 1928 (Wash. Ex. 11, p. 147). The final decree (Wash. Ex. 1) in the General Oregon Adjudication of the stream was not entered until 1933 (Stipulation No. 1, p. 1). As heretofore shown there has always been a substantial supply of water coming into Washington from the Oregon streams for use during the late spring, early summer and during the summer, until recently, when the summer supply has greatly diminished.

It is not believed that the State of Oregon and its citizens can legally sustain a right to the entire supply of the stream system in Oregon under these conditions by the application of the doctrines of adverse use and estoppel or otherwise.

Judge Whitson, in the case of *Morris v. Beau* (1906), 146 Fed. 423, describes the difficulties involved in the application of the rule of adverse use as between private parties in the following language (page 433):

"The statute of limitations is applied by analogy in courts of equity to that relating to the possession of real estate. It never runs upon a scrambling possession. It presupposes adverse, exclusive, and uninterrupted possession under a claim of right. The claim must be hostile to that of the person against whom it is asserted. The aid of the statute has occasionally been invoked with success in cases of this character, but not under conditions similar to those of this case.

"The defendants made their first diversions of water in 1893. A few of them have brought themselves, barely within the statutory period. It often happens that persons who are takers of water from a stream gradually enlarge their diversions until they begin to deprive the first appropriators of the amount to which they are entitled. The taking is so gradual, and the enlargement of the use so imperceptible, that it is impossible to fix a time when it begins to be adverse. This is not an unusual

situation, and it is presented by the testimony here. The quantity of water in this stream varies greatly from spring floods to low water in the fall. Most small streams are subject to this variation. The flow of water varies also with the seasons, depending largely upon the amount of snowfall or rain in the mountains. It is manifestly impracticable to apply the statute of limitations to such a state of affairs, and in this case particularly it could not apply, because the defendants have not had the uninterrupted use of the water for the statutory period. It is shown that they at times turned the water down, upon demand of the complainant. They have gradually increased their diversions, and just at what point they encroached upon the rights of the complainant and the intervener cannot be determined from the testimony, and just how long it has continued cannot be ascertained; but it is clear that they did not do so to any considerable extent until after the year 1893, and this suit was brought in 1903. As to real estate the possession is easily discovered. It is susceptible of actual proof, but here it is not shown that either the complainant or intervener were ever entirely deprived of water. During the flood time water always reached them. They had the use of it for a time, some years longer than others. Who can divine with definiteness just what amount of water the defendants used to the exclusion of the complainant or intervener, or how long it was used to their exclusion each year? The burden is upon the defendants to bring themselves within the statute, and the proof must be clear before a prescriptive right will be enforced. The claim cannot prevail under the conditions disclosed. *Last Chance Ditch Co. v. Heilbron* (Cal), 26 Pac. 523; *Fogarty v. Fogarty* (Cal.), 61 Pac. 570; *Boyce v. Cupper* (Or.), 61 Pac. 642; *Huston et al. v. Bybee* (Or.), 20 Pac. 51; Long on Irrigation, Secs. 90-91-92."

This decision was affirmed on appeal to the United States supreme court.

*Bean v. Morris* (1911), 221 U. S. 485, 55 L. ed. 821.

The same situation exists with respect to the application of the doctrine of private estoppel. It is said that the State of Washington and its citizens have failed to object to the use of water in Oregon or to take any action

to prevent such use. (Stipulation No. 10, p. 2.) Even as between private persons, inaction is never in itself sufficient to create an estoppel.

21 C. J. Estoppel, sec. 154, p. 1150.

The rule of private estoppel is stated in the case of *Morris v. Bean, supra* (1906), 146 Fed. 423, 433, as follows:

"It is safe to say that few cases of this character have been tried where the defense of estoppel has not been interposed with result uniformly unsuccessful. The estoppel argued for here is that the parties now seeking to assert their rights ought not be allowed to do so, because they knew that the defendants were building up their improvements, and relying upon the use of the water to maintain them. An all sufficient answer to this is that the defendants knew also that the complainant and intervener were relying upon the same water to maintain their improvements already made, and to carry on their farming operations already begun. Under this view of it, the one side is as much estopped as the other."

Affirmed *Bean v. Morris* (1911), 221 U. S. 485, 55 L ed. 821.

See also:

*Holbrook Irr. Dist. v. Arkansas Val. S. B. & I. L. Co.* (1929), 42 Fed. (2d) 541, 546.

Nor do we believe that the existence of private vested rights constitutes a defense herein. This action was instituted to determine the rights of the two states in the interstate stream in question. There are private vested rights involved in both states. The complainant is prosecuting the instant case in its sovereign capacity as a State of the Union.

*Georgia v. Tennessee Copper Co.* (1907), 206 U. S. 230, 237, 51 L. ed. 1038, 1044;

*North Dakota v. Minnesota* (1923), 263, U. S. 365, 373, 68 L ed. 342, 345.

*(2) Municipal Law Not Necessarily Controlling in Controversy Between States*

It is not believed that the application of the doctrines of adverse use and estoppel to rights of the respective states, as contended by Oregon, in the instant case would result in an equitable apportionment of the benefits of the use of the waters of the Walla Walla river to which each state is entitled. The rules of the municipal law are not applied by this court in a controversy of this nature where injustice will result.

In the case of *Connecticut v. Massachusetts, supra,* (1931), 282 U. S. 660, 75 L. ed. 602, 51 Sup. Ct. Rep. 286, Justice Butler states:

"The determination of the relative rights of contending states in respect of the use of streams flowing through them does not depend upon the same consideration and is not governed by the same rules of law that are applied in such states for the solution of similar questions of private right. *Kansas v. Colorado,* 185 U. S. 125, 146, 46 L. ed. 838, 846, 22 S. Ct. 552. And, while the municipal law relating to like questions between individuals is to be taken into account, it is not to be deemed to have controlling weight."

The State of Oregon, in the instant case claims the right to all the water in the stream system at the Red bridge and above irrespective of priority of use, as against the State of Washington. (Stipulation No. 10.) The use of water in Oregon has continued to increase from year to year. This increase has not ceased and presumably will continue. (Stipulation No. 3, pp. 11-12., Wash. Ex. 29, II p. 1-8.) The upper reaches of the stream lie in Oregon, and that state has an advantageous position with respect to the supply of the stream. This position should not be used to give Oregon a monopoly

of the stream supply to the wrongful injury of the State of Washington.

The rule applicable to such a situation is stated in the opinion in the case of *New Jersey v. New York, supra* (1931), 283 U. S. 336, 75 L. ed. 1104, 51 Sup. Ct. Rep. 478, in the following language:

"A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it. New York has the physical power to cut off all the water within its jurisdiction. But clearly the exercise of such a power to the destruction of the interest of lower States could not be tolerated."

In the case of *Howell v. Johnson, supra* (1898), 89 Fed. 556, after pointing out that the right to appropriate waters, on an interstate stream in Montana and Wyoming, is protected by the acts of Congress of July 26, 1866 and of July 9, 1870, (U. S. C. A. Title 43, Sec. 66) *supra*, the Court observes:

"When a party has obtained title to property from the National Government, the State Government has no right to destroy that title, except under the power of eminent domain. The State of Montana cannot step in and say, 'The right to the Water of Sage Creek, which the plaintiff acquired under the laws of Congress, you cannot exercise in this state.' This would be the taking of plaintiff's property without due process of law. It is a recognized rule of law that a person who has appropriated water at a certain point in a stream is entitled to have so much of the waters of said stream as he appropriated flow down to him to the point of his diversion."

The doctrine of adverse use and estoppel has been applied as between states in boundary disputes.

*State of Michigan v. State of Wisconsin* (1926), 270 U. S. 295; 70 L. ed. 595; 46 Sup. Ct. Rep. 290;

Honnold, Supreme Court Law, Vol. 1, p. 65-66, and the case therein cited.

The doctrine is seldom applied to rights on interstate streams. One reason is suggested in the case of *Morris v. Bean, supra* (1906), 146 Fed. 423, in the following words:

"As to real estate the possession is easily discovered It is susceptible of actual proof, but here it is not shown that either the complaint or intervenor were ever entirely deprived of water. During the flood time water always reached them. They had use of it for a time, some years longer than others."

In our view, long continued use by one state of property belonging to another is a fact, if it exists, to be considered by this court in an original action involving a controversy between states over their respective rights in the property in dispute, but the court is not circumscribed by any rule of municipal law of any or all of the contending states in determining the controversy.

The rule relative to prescriptive rights claimed by a nation, generally recognized in international law, is tersely stated in Oppenheim, International Law, Vol. 1, Sec. 243, p. 294, as follows:

"From the conception of prescription, as above defined, it becomes apparent that no general rule can be laid down as regards the length of time and other circumstances which are necessary to create a title by prescription. Everything depends upon the merits of the individual case. * * *"

*(3) A Stream Section of Intermittent Flow Does Not Divide a Single Stream System into Two Independent Streams*

The record discloses that the diversion of a substantial quantity of the waters of the main stream at

the Red bridge into the Little Walla Walla renders the surface of the bed of the Tum-a-lum dry between the Nursery and the McCoy bridges. This practice, in our view, does not divide the stream into two independent systems or change the relative rights of the two states in and to the waters of the entire stream system. In any event, the higher waters run in the channel and the subsurface flow breaks out in springs below the McCoy bridge.

The rule is stated in the case of *Kansas v. Colorado, supra*, as follows (115):

"Equally untenable is the contention of Colorado that there are really two rivers, one commencing in the mountains of Colorado and terminating at or near the place where the former ends, and from springs and branches starting a new stream to flow onward through Kansas and Oklahoma towards the Gulf of Mexico. * * * That there is a great variance in the amount of water flowing down the channel at different seasons of the year and in different years is undoubted: that at times the entire bed of the channel has been in places dry is evident from the testimony. In that way it may be called a broken river. But this is a fact common to all streams having their origin in a mountainous region, and whose volume is largely affected by the melting of the mountain snows. * * *"

See also *Hildebrandt v. Montgomery* (1925), 119 Ore. 214, 234 Pac. 269.

In dealing with asomewhat similar condition in the case of *Morris v. Bean, supra* (1906), 146 Fed. 423, the court observed:

"The defendants claim * * * that it is inequitable * * * 'to lay barren and waste the lands of defendants in Montana that two farms in Wyoming may be supplied with water.' This may appeal to state pride and local bias but the contention disregards the maxim that he who is first in time is strongest in right, which

is the very essence of the doctrine of appropriation. Complainant and intervenor in this case found certain natural conditions. There was a running stream upon the public lands, supplied from the snows of the Pryor Mountains. It afforded water sufficient for their purposes. The arid lands near and adjoining which were subject to settlement invited its use. Their needs as farmers required it. They took advantage of the benefits which the laws guaranteed and which the conditions made available; hence the plea on behalf of the defendants that the creek goes dry every year and did prior to their settlements is not a defense though it might, for the purpose of this decision, be admitted without aiding them. If the creek goes dry every year it is because of the shortage of the supply above. * * * The appropriators took with the right to have the stream continued to flow as it was wont to flow and to remain in the condition in which they found it, and whenever water is diverted above it keeps back that which would otherwise reach them, and the more water that is kept back the less will the complainant and intervenor have. But for the wholesale diversions by defendants the water would reach them later in the season and abide longer and this is what their appropriations entitle them to. In the abstract there would be more people benefitted by allowing the defendants to take all the water. Its flow through a sandy and gravelly stretch of something like 8 or 10 miles and perhaps farther is in a measure a waste but equity does not consist in taking the property of a few for the benefit of the many even though the general average of benefits would be greater.

"The witnesses have perhaps told the truth but not all the truth. That the water would not reach one lower down the stream is quite a common defense. It is often urged in irrigation suits by trespassers as a justification for their invasion of the rights of others. It is probably as old as irrigation and perhaps as trespass itself. In this case failure of the water to reach the complainant and intervener was co-incident with its use by the defendants. The fact that witnesses saw in the varying changes of the seasons a shortage of water at different points on the stream does not explain the whole situation; in other words, in one extremely dry season perhaps the water was lower than in another. It varies and

it varies because of the shortage of the supply above and these defendants retarded its flow by reason of their diversions which decreased the supply to that extent which prevented it from reaching Wyoming at all; and when the supply is diminished by the light snowfall the diversion of the defendants increases the shortage and that is an invasion of the rights of the appropriators who are seeking the enforcement of their priorities in this suit."

All natural stream channels are more or less wasteful. The natural channels through which Oregon distributes water to the lands over the Milton-Freewater fan are wasteful. The Tum-a-lum section of the main stream is no exception. It is a losing stream in this section. A number of Oregon witnesses testified concerning measurements taken to show that 25 c.f.s. or more of water would be lost in this section of the stream (Ore. Abs. pp. 24, 25, 48, 54, 55). Dr. Woodburn for Washington and Mr. Humphrey for Oregon made a study of this section of the stream in June, 1932. At that time 20 c.f.s. was allowed to flow past the Nursery bridge. It did not get over the dry spot as a surface flow but there was a flow at the state line continuously (Wash. Nar. T. p. 144). Most of these measurements were taken after the channel had been dry and were limited to this particular section. No observations were made of the flow farther down the stream where the water would first make its appearance. The loss in this section of the stream can be reliably ascertained only by measurements in times of continuous flow. These measurements should include the flow, also, farther down the stream in Washington. The only measurements of that nature shown in the record were conducted by Dr. Woodburn for Washington during November and De-

cember, 1933. Concerning these measurements, Dr. Woodburn testified in substance as follows:

"As to my opinion as to what is the loss of water in the Tum-a-lum section from the Nursery bridge to the Washington state line, I will say that under the conditiions of steady flow, which occur very seldom throughout the year in that stretch, the measurements which we have, as given in Hydrographic Data, Exhibit No. 18, indicate that during the period from the 18th of November, 1933 to the 5th of December, 1933, inclusive, was a period of fairly steady flow at the Milton Nursery bridge, at the state line, and at the State Highway bridge, about two miles below the state line. The average flow during that time at the Nursery bridge was approximately 20 cubic feet per second. The average flow during that time at the state line was approximately 15 cubic feet per second. The average flow at the state highway during that time was approximately 18½ cubic feet per second."

"That gives a very strong indication, therefore, and is the most reliable data that we have and indicates that the losses in the Tum-a-lum from the Nursery bridge to the state line do not exceed seven cubic feet per second at that flow, while from the Nursery bridge to the state line (Highway) the losses do not exceed 3½ cubic feet per second. The distance from the Nursery bridge to the state line is about four miles, and from the Nursery bridge to the State Highway bridge is between five and six miles."

### *(4) Separate Administration in Oregon*

The State of Oregon alleges that water has been distributed by the Oregon water master from the Walla Walla river, the West Little Walla Walla river, called West Prong in Oregon, and the East Little Walla Walla river, called East Prong in Oregon, as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and without regard to any claim of right of diversion or use on the part of

any lower diverter from said stream in the State of Washington. (Stipulation No. 10, p. 8.)

It is contended that this method of administration of the water has caused the Tum-a-lum section of the main stream to dry up in the summer and has resulted in a relinquishment of the rights of the lower users on the stream to have water flow through the Tum-a-lum section of the stream in the summer.

This contention is closely related to the claim of adverse use and estoppel which has heretofore been considered herein. The same rule with respect to the municipal law as mentioned in connection with the claim of adverse use and estoppel is applicable to this contention.

Water is flowing in the channel of the Tum-a-lum section of the main stream a great part of the year. The subsurface flow is continuous and breaks out in springs below the McCoy bridge. The amount of the flow in any natural stream varies in different sections of the stream. Some sections are gaining and some are losing. A diversion of the surface flow at one point is not a diversion of the whole stream supply. Periodic diversions of varying duration and beginning at different times in the year cannot be made the basis of a claim of monopoly of all the water in the stream system, which will be the logical result if Oregon's contention is sustained.

We appreciate the fact that diversions away from the main stream must be made in some instances to satisfy early rights in Oregon. The Peacock Mill company, for example, has a right with a priority date of 1888 to divert 56.25 c.f.s. from the Walla Walla river. Its power plant discharges into the Little Walla Walla river just above the "Frog". This throws 56 c.f.s. into the natural

channels in that locality. These channels, however, as heretofore pointed out have physical connection with the East and West Little Walla Walla rivers which run across the state line into Washington and join the main stream.

The problems of administration in Oregon do not enlarge the rights of Oregon to the waters of the river systems beyond reasonable necessities. They do not create a license to Oregon to use all the waters of the stream system in that state without regards to the rights of the State of Washington.

## 3. CONCLUSION

(I) It is believed that in the interest of such future development as may be possible through improvements making more water available during times of water scarcity, the rights of the State of Washington to the water supply coming to Washington from the stream system in Oregon, should be more clearly defined than in the report of the Special Master herein.

(II) It is believed that an equitable apportionment of the benefits of the use of the waters of the stream system by Oregon does not require as liberal a rate of allowance of water as the maximum rate provided in the General Oregon Decree. (Wash. Ex. 1.)

(III) It is believed that the State of Washington is entitled to a decree herein assuring it and its citizens of its equitable share of the supply of the stream system.

(IV) It is believed that a decree herein enjoining the State of Oregon from diverting and using more of the waters of the stream system in Oregon than that determined by this court as its equitable share of the waters of the stream, will tend to remedy the waste of water and the injury to the ground water support of the stream complained of by Washington.

(V) It is believed that the rule of the *Wyoming-Colorado* case may properly be applied herein. The record shows that the average summer stream water supply in the related area in Washington is sufficient to satisfy rights with 1891 and earlier priorities and to satisfy part only of the rights of 1892 priority, while the average summer stream water supply in the related area

in Oregon is sufficient to supply all rights with 1892 and earlier priority with considerable surplus for satisfaction of rights of priority later than 1892. It is believed that the complainant herein is entitled to a decree awarding to the State of Washington its equitable share of the surplus in Oregon over and above the amount of water necessary to supply rights on the stream system in that state with priority of 1892 and earlier and enjoining the State of Oregon and its citizens from diverting or using such share of water as shall be awarded to the State of Washington.

(VI) It is believed that the decree herein should incorporate the provisions of the settlement of the relative rights of the two states in the waters of Mud and Pine creeks and their respective tributaries set out in stipulation No. 2, on file in this cause.

Respectfully submitted,

G. W. HAMILTON,
*Attorney General,*

GEO. G. HANNAN,
*Assistant Attorney General,*

FRED J. CUNNINGHAM,
*Special Counsel,*

*Counsel for Complainant,*
*State of Washington.*

IN THE

# SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

---

NO. 11, ORIGINAL

---

OCTOBER TERM, 1935

---

THE STATE OF WASHINGTON,
*Complainant,*
*v.*
THE STATE OF OREGON, *Defendant.*

---

## PROOF OF MAILING COMPLAINANT'S BRIEF UPON COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

---

STATE OF WASHINGTON,
County of Thurston. } *ss.*

The undersigned being first duly sworn on oath deposes and says that on the .....day of January, 1936, at Olympia, Washington, ....he deposited in the United States Postoffice in sealed envelopes, one addressed to "Mr. Isaac H. Van Winkle, Attorney General, Salem, Oregon," one addressed to each "Mr. James A. Fee and Mr. Charles Z. Randall, Pendleton, Oregon," and one addressed to "Mr. George T. Cochran, LaGrande, Oregon," counsel for State of Oregon, true copies of the

foregoing Complainant's Brief upon Complainant's Exceptions to the Report of the Special Master in the above entitled cause.

.....

Subscribed and sworn to before me this.....day of January, 1936.

.....

*Notary Public, residing at Olympia, Washington.*

My commission expires.....

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CHARLES ELMORE CROPLEY
CLERK

IN THE

# Supreme Court of the United States

IN EQUITY

No. 11, ORIGINAL

OCTOBER TERM, 1935

THE STATE OF WASHINGTON, *Complainant*,

*v.*

THE STATE OF OREGON, *Defendant*.

# BRIEF OF STATE OF OREGON UPON EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

I. H. VAN WINKLE,
Attorney General for the State of Oregon.

JAS. A. FEE,
COLON R. EBERHARD,
GEO. T. COCHRAN,
C. Z. RANDALL,
Special Counsel for the State of Oregon

Solicitors for Defendant State of Oregon.

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IN THE

# Supreme Court of the United States

IN EQUITY

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No. 11 ORIGINAL

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OCTOBER TERM, 1935

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THE STATE OF WASHINGTON, COMPLAINANT,

*v.*

THE STATE OF OREGON, DEFENDANT.

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# BRIEF OF STATE OF OREGON UPON COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

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## I.

## STATEMENT

### (a) Criticism of Statement in Washington Brief.

In a small paragraph on page 8 of Washington's brief is a statement to the effect that the Little Walla Walla river and its distributaries are "short cut by-passes" from the main stream in Oregon to the main stream in Walla Walla.

It is only during time of flood and extreme high water that any water flows through these distributaries and into Washington.

During and throughout the irrigation season these distributaries (the Ford and Crockett branches) have a dry stretch in their course similar to the dry stretch in the Tum-a-lum (Or. Abs. of Record, Schwald, 33; Rogers, 34; Roeder, 41 and 42; Perry, 48; Elba Rogers, 31; and Mason 55) and no water from the stream in Oregon is supplied for irrigation in Washington through these channels.

Under the heading "Precipitation" (Wash. Brief 10 to 12) is a discussion of precipitation records at Milton, Walla Walla, and Lowden. It must be remembered that no records of precipitation in the mountains above Milton are kept. Because of the steepness of the ground such rains have an immediate effect on the water supply of the stream in the irrigated districts, although there may have been no rain in the lowlands. Wash Exhibit 18, page 7, shows no rain at Milton from May 27, 1932, to September 30, 1932, save a trace on August 9 and a trace on September 23, yet Wash. Exhibit 18, page 54, shows that on the south fork of the Walla Walla river at Station 214 the river rose 19 c.f.s. from June 2 to June 4; 16 c.f.s. on June 10; 19 c.f.s. on July 3; 28 c.f.s. on September 20. These "flashes" of the stream could only be caused by unrecorded rain in the mountains.

At the bottom of page 12, Washington's brief, there is a reference to "ground water storage". It must be understood that the ground water is a wave moving down the slope—a hill of water. There is no reservoiring underground, and no static water. (Or. Abs., Piper, pp. 69, 71, 72, and 75.)

On page 14, Washington's brief, there appears the statement "There is little if any regulation above the

forks and there is generally an over-diversion". This has no effect upon the problem. The stream is regulated there (Or. Abst. pp. 52 and 53.) The canyon there is narrow—the walls are steep—the water is used near the riverbanks—the soil is loose gravel—the canyon is floored with basaltic rock, and the water not absorbed by plant life returns at once to the stream and no substantial waste results (Wash. Nar. Test., Chase, p. 21; Or. Abst. Mason, pp. 52 and 53; Perry, p. 48; Harding, p. 124). There is no proof of loss of water in any quantity in this stretch—only vague estimates no better than guesses.

The table on pages 16 and 17 of Washington's brief and the conclusions drawn therefrom are valueless because they deal only with a "mean" flow and a "daily average of below mean flow". "----- the stream is subject to an annual spring freshet and is flashy throughout the year." (R. p. 12; Stip. No. 3, Par. 1.) A "mean" flow can not furnish a standard for practical distribution of water on a "flashy stream". Nor is this difficulty cured by calculating a "daily average of below mean flow", which would simply be to substitute one "mean" for another.

On page 20, Washington's brief, under the heading "total Summer Supply in Oregon", is an attempt to calculate an "average summer supply of the stream in Oregon". The flashy nature of the stream makes such a calculation valueless as a basis of decision or argument in this case. (Wash. Ex. 18, pp. 24 to 63.) Tables of Stream Measurements in Oregon show that there is such a variance from year to year in measurements taken at the same measuring stations as to make it impossible to use such an "average" as a basis of distribution. The years of plentiful supply and the years

of scarcity of supply do not alternate in anything approaching regular order.

Pages 20 to 24, Washington's brief, are devoted to a discussion of water supply in Washington. The Washington measurements referred to are too scanty and scattered to furnish a basis for calculation of water supply or for comparison with Oregon.

On pages 29 to 32, Washington's brief, are set forth "estimates" as to the quantities of the acreage in the various soil classes in Oregon and Washington. These so-called "estimates" are mere guesses and can furnish no basis of decision in this case, since counsel for Washington admitted at the hearing before the Special Master that "it is impossible to make a real estimate". (Wash. Nar. Test. p. 10.)

Pages 34 to 36, Washington's brief, give a partial history of adjudication of water rights. In addition to the matters there mentioned it should be noted that beginning in 1905 and terminating in 1912 there was an adjudication by the courts of water rights from the main stream in Oregon (Or. Ex. 31), and that since 1911 the distribution of water in Oregon has been under the control of water masters who are state officers. (R. 236 to 238; Or. Abs. Roeder, p. 41.)

On page 39, Washington's brief, is the statement, "More or less the same types of crops are grown on the related areas in the two states". Although this is true in a sense, the statement is misleading. In Oregon but 2,500 acres of the 10,000 acres irrigated are planted to grain and alfalfa (crops requiring a small amount of water), while the balance is planted to orchards, vegetables and small fruits requiring a far

greater amount of water. (R. 15, Stip. 3, § III.) In Washington the greater part of the irrigated land is devoted to the raising of alfalfa and grain.

**(b) Stream System.**

The north and south forks of the Walla Walla river each flows through steep rock-walled canyons floored with basaltic rock to the "forks" where they converge, and, after uniting, flow through a similar canyon to the city of Milton (R. 82). From Milton the rock walls diverge at a wide angle open to the north and west which incloses a broad area floored by stream deposits—the so-called "gravel fan", described in Piper's report (Wash. Ex. 16, p. 125; R. 85). From the sources of the forks to the end of the canyon the stream is a gaining stream.

At Milton the Little Walla Walla system of distributaries (the Little Walla Walla which separates into the Ford and Crockett branches, which in turn each separate into several branches or prongs) spread out over the "gravel fan" (Wash. Ex. 16, p. 127; R. 86).

At the point where the Little Walla Walla river diverges from the main stream at the "Red bridge", all waters have, during each irrigation season from 1880 to the present time, been diverted from the main stream into the Little Walla Walla distributary system, and thus spread out over the gravel fan so that the Tum-a-lum or main stream has been dry throughout the irrigation season from the Nursery bridge to the McCoy bridge, a distance of two miles (Or. Abs. Forsythe, pp. 25 and 26; Fee, pp. 40 and 41; Alta Rogers, pp. 33 and 34; Elba Rogers, p. 28; Schwald, pp. 32 and 33; Burlingame, pp 21 and 22; Roeder, p. 41; Perry, p. 47; Wash. Nar. Test. Woodburn, p. 144).

The waters in the Little Walla Walla distributary system are so used by irrigation that the several channels from 1889 to date have been rendered entirely dry before leaving the gravel fan, so that there is no flow of water through these channels to the lower stream system during any part of the irrigation season and all waters are used in irrigation on the gravel fan (Or. Abs. Schwald, p. 33; Rogers, p. 34; Roeder, p. 42; Perry, p. 48; Elba Rogers, p. 31; Mason, p. 55). Thus all of the waters of the stream have been used during the dry season without protest on the part of Washington.

Throughout the gravel fan the main stream and all of the distributaries are losing streams (R. 130).

Because of the permeable nature of the soil on the gravel fan all water used in irrigation, and not absorbed by plant life or lost by evaporation, sinks and becomes a part of the ground water supply. This ground water supply is not in the nature of an underground lake, river, or reservoir (Or. Abs. Piper, pp. 69, 71, 72 and 75), but is purely percolating water, similar to a hill or slope of water percolating radially outward under the whole gravel fan (Or. Abs. Piper, p. 70).

Because of the slope of the ground over the gravel fan decreasing from 80 feet to the mile at Milton to 40 feet to the mile at Whitman, and, because of the ground water encountering deposits of impermeable material at the edge of and below the gravel fan, the ground water breaks out into three zones of springs, described in Piper's report (R. 131 to 138). These zones of springs are concentric around the apex of the gravel fan at Milton and the first zone breaks out in the river channel at or near the McCoy bridge, about one mile south of the state line. Other springs in this zone form tributaries to the main stream.

This action of the underground water makes the Walla Walla river a gaining stream from the McCoy bridge on (R. 137).

The water from these springs has furnished the only water (aside from Mill creek and other tributaries in Washington) which was available for summer irrigation in Washington since before 1880 to the present time.

### (c) Irrigation Development.

The rainfall in the area is about 12 or 13 inches annually, with only from 1½ to three inches during the summer months. The lands therefore require irrigation in order to produce a crop. The first irrigation was practiced in the state of Washington. The richest and most productive soil in Washington, in the Walla Walla basin, is along the tributaries which have a water supply either wholly from the state of Washington, or from Oregon at a point where Oregon can not use it. The first irrigation in Washington was therefore from these tributaries. In Oregon, however, the richest land is upon the gravel fan and is irrigated from the main stream and its distributaries.

The table included in Stipulation 3 indicates that prior to 1892 the most intensive development by irrigation in Washington was upon these tributaries, while the most intensive development by irrigation in Oregon was upon this main stream and its tributaries. Thus in 1891 it appears that in Oregon 2,231.67 acres were irrigated by water from the Walla Walla river, while only 285 acres were irrigated from that source in Washington.

The same tabulation shows (R. 19 and 20) that the development of irrigation in Oregon from the Walla

Walla river from the beginning to the present time was steady and regular. It represents the steady growth and settlement of a new country.

On the other hand, the development of irrigation in Washington from the Walla Walla river was sporadic. Although the tabulation (R. 20) shows more than 8,000 acres with a priority of 1892 listed in the Washington decrees, this is very misleading. 7,000 acres of this 8,000 acres are in the Gardena project.

Stipulation No. 5 (R. 28 to 38) shows that the first irrigation of any part of this 7,000 acres was in 1898 and that only 68 acres were irrigated in that year. In 1899, 20 additional acres (of the 7,000) were put under irrigation, but these were abandoned in 1918. In 1901, 280 additional acres (of the 7,000) were placed under irrigation, but these also were abandoned in 1918. In 1904, 105 additional acres (of the 7,000) were irrigated. Therefore, out of the 7,000 acres of land tabulated as of an 1892 priority, only 473 had actually been irrigated by 1904 (12 years later), and 300 of the 473 acres were later abandoned. The record shows (R. 38) that even now only 4,530.2 acres in Washington out of this 7,000 acres are now irrigated.

All of this land has been developed and irrigated without the use of any of the water flowing in the stream in Oregon above the Red bridge (Or. Abs. Burlingame, p. 21).

The same tabulation (R. 20 and 21) shows that the development of irrigation in Washington from waters of the main stream was sporadic. As many as six years would elapse without any irrigation of additional lands in Washington from this source of supply, yet in Oregon the development progressed steadily year by year.

The gravel fan is intensely cultivated. It is extremely rich in its production. It has a population of over 5,000. The average farm acreage on the gravel fan is about seven acres. Counting the total acreage irrigated in Oregon, the average farm is a little over 10 acres. The assessed value of property in the irrigated district in Oregon is close to $3,000,000, and the actual value is more than double that amount. (Stip. No. 3; R. 18.)

The intensive development and the luxuriant production of the lands on the gravel fan in Oregon is based upon the use of the water of the Walla Walla river, supplemented by the use of wells. On the other hand, Washington's development has been made by the use of flood waters; waters of Washington tributaries and waters arising below the inner zone of springs and, during the dry season, without the use of any waters arising above the Red bridge in Oregon.

Washington, by this case, seeks to acquire that which she has never had, namely, the right to use during the dry season waters rising above the Red bridge in Oregon.

## ARGUMENT

Pages 52 to 89, Washington's brief, are devoted to a discussion of some of the Master's Findings of Fact. Isolated sentences and paragraphs are discussed without regard to the whole. Because of the arrangement and context of the discussion no helpful summary can be made.

We follow the arrangement and numbering adopted by Washington.

## BURDEN OF PROOF.

In discussing these questions of fact, it is necessary to bear in mind where lies the burden of proof and whether the complainant has established its contentions in accordance with the rules governing the burden of proof.

Washington seeks injunctive relief against Oregon. The burden of proof in such a case is much heavier upon the complaining state than it would be in the case of an individual plaintiff.

In *North Dakota v. Minnesota*, 263 U. S. 365, 374, the supreme court held:

> "In such action by one state against another, the burden on the complainant state of sustaining the allegations of its complaint is much greater than that imposed upon a complainant in an ordinary suit between private parties. 'Before this court can be moved to exercise its extraordinary power under the constitution, to control the conduct of one state at the suit of another, the threatened invasion of rights must be of serious magnitude and it must be established by clear and convincing evidence.' New York v. New Jersey, 256 U. S. 296, 309; Missouri v. Illinois, 200 U. S. 496, 521."

In *Kansas v. Colorado*, 206 U. S. 46 at 109, (51 L. Ed. 956), this court, speaking through Mr. Justice Brewer, said:

> "—It should be clear that such sister state has not merely some technical right, but also a right with a corresponding benefit."

This burden of proof can only be met by the establishment of facts by clear and convincing evidence. It is not met by declarations, contentions, estimates, or calculations on the part of counsel.

## (I)
## AS TO FINDINGS OF FACT

Paragraph (1) on page 59 of Washington's brief merely states counsel's contention that the Master's Report fails to consider certain physical conditions of the stream system. It refers to no evidence, stipulations, or exhibits. The Master visited and went over the stream system, and saw and observed the physical conditions on August 23 and 24, 1933. (Master's Report, p. 2.) His report is replete with references to and discussions of the very conditions counsel charges him with ignoring.

**Paragraph (1), pages 60 and 61, Washington's Brief.**

In this paragraph Washington attacks the Master's Finding that the stream flows are variable and that a community can not develop and maintain itself on sporadic supplies of water. The Master's Finding is amply sustained by stipulations and proof.

Stipulation No. 8 (R. 12) says:

> "——the stream is subject to an annual spring freshet and is flashy throughout the year."

The same language appears in Piper's report (Wash. Ex. 16; R. 89), and on that page Piper further states:

> "Thus although the daily discharge was commonly less than 150 cubic feet a second and exceeded 800 cubic feet a second on only 18 days of the 5-month period ending February 28, 1933, it twice rose to about 1,000 cubic feet a second, but maintained that discharge less than 24 hours."

See also hydrograph (R. 90 A).

W. C. Mason testified (Or. Abs. p. 53) that in June, 1927, a freshet raised the stream 1,000 second-

feet in 20 minutes when the stream had been flowing but 125 second-feet, and (Or. Abs. p. 56) that there were drops as high as 25 second-feet in a day.

Warren Roeder testified (Or. Abs. p. 142) that when it rains there are floods over the tops of the channels.

Turning to Washington Exhibit 18, which is the Record of Stream Measurements from which counsel has made his calculations as to "mean" flow and "daily average of below mean flow", and selecting a few pages at random we find:

Washington Exhibit 18, page 38, covering measurements of the Walla Walla river near Milton shows that during the period from August 7 to August 15, 1920, there were fluctuations of as high as 7 c.f.s. and 8 c.f.s. in a day. From August 24 to August 31 there were fluctuations of from 7 c.f.s. to 29 c.f.s. in a day. From September 10 to September 17 there were daily fluctuations ranging from 4 to 20 c.f.s. From September 21 to September 31 fluctuations ranged from 5 to 18 c.f.s. in a day. During June the stream was never at the same level more than two days in succession, and there were daily fluctuations ranging from 4 c.f.s. to 52 c.f.s. During the month of May of that year the stream was never the same but two days at a time and there were daily fluctuations ranging from 4 c.f.s. to 118 c.f.s.

Washington's Exhibit 18, page 39, covers measurements of the Walla Walla river near Milton during 1918. From July 5 to July 8 there were fluctuations on two different days of as high as 15 c.f.s. From July 16 to July 20 there were fluctuations of 20 c.f.s. and of 15 c.f.s. in a single day. July 25 to July 31 we

find fluctuations of as high as 32 c.f.s. in one day. From August 25 to August 31 fluctuations were as high as 15 c.f.s. in one day. From September 6 to 7 the stream jumped 18 c.f.s. in one day. From September 10 to September 11 the stream jumped 10 c.f.s. in one day and dropped 10 c.f.s. on the 12th. From September 13 to September 17 fluctuations were as high as 10 c.f.s. in one day. During the month of June of that year there were four different days that the stream rose or fell as much as 15 c.f.s. in one day.

Washington's Exhibit 18, page 42, covers measurements on the Walla Walla river near Milton in 1924. It shows that from July 4 to July 9 there were fluctuations of as high as 13 c.f.s. in one day. From August 1 to August 7 fluctuations were as high as 11 c.f.s. in one day.

Washington's Exhibit 18, page 48, covering measurements of the Walla Walla river near Milton for the year 1926 shows that from August 29 to September 2 fluctuations of 17 c.f.s. and of 26 c.f.s. and 11 c.f.s. in a single day are shown. From September 21 to September 25 there was a fluctuation of 17 c.f.s. in one day.

Washington's Exhibit 18, page 50, covering measurements of the Walla Walla river near Milton in 1928 shows that on July 3 there was a fluctuation of 14 c.f.s. in a single day. On September 14 there was a fluctuation of 11 c.f.s. in one day.

Washington's Exhibit 18, page 58, shows that in 1932 from July 1 to July 5 there were fluctuations of 10 c.f.s. in one day and of 13 c.f.s. on another day, and that in September from the 19th to the 23d there was a fluctuation of 16 c.f.s. in a single day.

Records for other years also show sudden changes.

Washington offered no contradictory evidence.

In the face of these stipulations and proofs Washington attempts to show that the Master's Finding of a variable stream flow is without basis of fact by calculating a summer average mean of 119.05 c.f.s. from 15 years of measurements. The table showing his calculation appears in his brief pages 16 and 17, and his conclusions on page 18.

The table shows the mean for July, 1922, to be 142 c.f.s. and the mean for July, 1926, to have been 80.6 c.f.s. A variation between the means in the most critical month of the year of 61.4 c.f.s., or a variance of over 50 per cent of counsel's mean. During July the "mean" was above counsel's 15-year mean seven years, and below it eight years (seven of which were in succession). During August the mean was above counsel's 15-year summer average mean but two years, and was below it 13 years, and that as between 1922 and 1930 there was a variance of 49.8 c.f.s. During September the mean was above counsel's mean five years and below it 10 years, with a variance between 1927 and 1930 of 68.1 c.f.s.

This study of counsel's tabulation shows the utter impossibility of using any "summer average mean" calculated over a period of years as a basis for division or distribution of water.

It justifies the Master's conclusion that: "An agricultural community can not develop and maintain itself upon sporadic supplies of water. The farmer must be able to place reasonable dependence upon the water supply if he shall make the expenditures and put forth

the effort necessary to reap the harvest incident to the combination of the soil with the water."

The situation in this case is similar to that in *Wyoming v. Colorado*, 249 U. S. 419; 66 L. Ed. 999, where Mr. Justice Van Devanter said on page 471:

> "Colorado's evidence, which, for convenience, we take up first, is directed to showing the average yearly flow of all years in a considerable period, as if that constituted a proper measure of the available supply. We think it is not a proper measure; and this because of the great variation in the flow. To be available in a practical sense, the supply must be fairly continuous and dependable." * * *

And again on page 476 said:

> "* * * Even on this basis there were 13 years in which the flow was below the average, and, of these, six came in immediate succession. In four the deficiency exceeded 100,000 acre-feet, and of the four only one followed a year in which there was an excess sufficient, if carried over in storage, to cover the deficiency. This suffices to show that the average of all years is far from being a proper or safe measure of the available supply. An intending irrigator acquiring a water right based on such a measure would be almost certainly confronted with drought when his need for water was greatest. Crops can not be grown on expectation of average flows which do not come, nor on recollections of unusual flows which have passed down the stream in prior years. Only when the water is actually applied does the soil respond." * * *

**Paragraph (2), pages 61 to 64, Washington's Brief.**

By this paragraph Washington attacks the findings of the Master that from 1880 to 1930 the irrigators within Oregon continuously and without interruption

and without protest diverted all the flow of the Walla Walla river rising above the Red bridge. This finding of the Master is amply supported by the uncontradicted evidence.

The evidence of Oregon's witnesses shows conclusively (and we believe without contradiction) that never within the memory of any witness has any water been permitted to flow down the Tum-a-lum river to the state of Washington or any of its water users after the spring flood waters subsided in any year (Or. Abs., Forsythe, pp. 25 and 26, (1880 on); Fee, pp. 40 and 41, (1885 and 1886); Alta Rogers, pp. 33 and 34, (1888 on); Elba Rogers, p. 28, (1889 on); Charles Schwald, pp. 32 and 33, (1892 on); Mason, p. 54, (1901 on); Burlingame, pp. 21 and 22, (1905 on); Roeder, p. 41, (1913 on); Perry, p. 47, (1918 to 1928); and by Washington's witness, Dr. Woodburn, (1932 and 1933), Wash. Nar. Test., p. 144).

For as long a time as the record covers, the connecting channel between the Ford branch and the Spring branches has been dry each year (Or. Abs., Schwald, p. 33, (1891 on); Alta Rogers, p. 34, (1890 on); Roeder, p. 42, (1913 on); Perry, p. 48, (1918 to 1928); Elba Rogers, p. 31, (1889 on)).

The same is true of the connecting channel between the Crockett and the East Little Walla Walla (Or. Abs., Alta Rogers, p. 34, (1889 on); Mason, p. 55, (1901 on); Roeder, p. 41, (1913 on); Perry, p. 48, (1918 to 1928); Elba Rogers, p. 31, (1889 on)).

On this point also Washington offered no contradictory evidence. Again counsel attempts to supply a lack of evidence and a failure to meet the burden of proof by an ingenious calculation.

Again he takes his 15-year mean and attempts to apply it to the years 1880, 1885, and 1890, which years are not even covered by his stream measurements. Such a calculation does not disprove the Master's Finding that the irrigators had appropriated to their use all of such water, regardless of whether or not that use in 1880, 1885, or 1890 was wasteful. The evidence is uncontradicted that they did appropriate all the water to their use, and that this use was continuous and without interruption and without protest. The calculation does not account for Washington's conduct in not protesting.

It is apparent that counsel has misconstrued the Master's use of the word "appropriate". The word was not used in the sense of completing a vested right to the use of water, but was merely used to designate a taking and use of the water. This is shown by the Master's language on page 55 of his report which follows, qualifies and explains the use of the word as follows:

> "The use of the water in the state of Oregon was with the knowledge of many of the irrigators within the state of Washington. (Wash. Abs. pp. 41, 42, 52, 64, 67; Or. Abs. p. 121.) The testimony shows that as early as 1891 there was being irrigated from the Walla Walla river through the Little Walla Walla river, within the state of Oregon something more than 2,200 acres of land. (Stip. No. 3.) Whatever this amount of land was, the diversion of the water of the Walla Walla river at the Red bridge was complete and continuous. The use may not have been as economical as modern irrigation methods, in a developed agricultural district, would dictate, but the fact remains that all of the water was taken and that it did not during the same period, return directly to the channel of the Walla Walla river through the Ford branch or the Crockett branch, which are the channels which would have

conducted any excess diversion back into the main river. (Wash. Ex. 17, Or. Abs. pp. 3, 7, 33, 34, 42, 48.) * * *"

The effect of this finding is to point out that Washington never had the use of this water, never claimed a right to its use, never protested when they saw Oregon use it, and has not yet acquired a right to the use of any of the waters rising in Oregon above the Red bridge during the dry season.

True it is that "excessive diversions can not legally consummate appropriations for the amounts of the excess", and that "waste of water is not tolerated in arid regions". But these legal rules are not involved in a discussion of this finding when its meaning and purpose are understood.

As the Oregon irrigated territory progressively developed, the use of water became carefully regulated and waste prevented. State regulation began in 1911 (R. 236–238), and has continued till the present time (Or. Abs. Roeder, pp. 41–43; Mason, p. 52; Perry, pp. 46–47) based on adjudications of water rights begun in 1905 and completed in 1912 (Or. Ex. 31) and other later adjudications (Wash. Exs. 1, 2, 3, 4, 5, 6, 7, 8, and 9), and state engineer's permits (Wash. Ex. 10), and such regulated use continuously exhausted the entire flow of the stream in Oregon arising above the Red bridge.

Based upon economical and beneficial use, appropriations of such water have been consummated in Oregon; vested rights acquired, and a great and valuable development of the Oregon community has been made with notice to and the knowledge of the state of Washington and without protest or any claim of right by it or any of its citizens.

The whole of the finding must be construed. To pick out one clause or word for an objection and construe it without any relation to the rest of the findings would not be a true criterion. The conduct of the state of Washington measured by all the facts, of which this finding states a part, makes it inequitable for Washington to have any right in the water claimed. The doctrine of equality of right forbids the destruction of the Oregon development to supply Washington with a right to water which they have never had.

**Paragraph (3) on pages 64 to 66 of Washington's Brief.**

This paragraph charges the Master with having failed to give full recognition to the physical condition of the Tum-a-lum section of the stream and the rights of the Washington users to the use of the natural stream bed for conveyance of water.

The argument as usual cites but two small excerpts from pages 53 and 54 of the Master's Report and ignores the fact that these excerpts are but a small part of a review of facts extending from the bottom of page 53 to 58 of the Master's Report, and culminating in a conclusion expressed upon page 58 to the Report, as follows:

> "To permit quantities of water to flow past the Red bridge during the low water stages of the river is wasteful and uneconomic."

Counsel does not dispute the basis of fact cited in the pages of the Master's Report above referred to nor does he dispute the conclusion reached.

The factual basis cited by the Master is as follows:

From 1880 on, the Tum-a-lum river from the Nursery bridge to the McCoy bridge has been rendered dry

by the action of the Oregon irrigators in diverting the entire flow of the stream to the Little Walla Walla.

Washington's witness, Dr. Woodburn, admitted the stream bed was wasteful and evaded the question as to whether it would be economical to attempt to convey 22 c.f.s. of water through it during June, July, and August (Tr. of Test. p. 441).

Twenty-five c.f.s. of water turned over the dam at the Nursery bridge in 1928 did not reach the McCoy bridge in 48 hours (Or. Abst. 24).

On November 1, 1933, 21 c.f.s. were released at the Nursery bridge and on the following day the flow past the Nursery bridge was increased to 25 c.f.s.; yet in a 48-hour period the waters had only reached one-half mile below the Nursery bridge (Or. Abst. 54).

In 1928, 25 c.f.s. permitted to flow past the Red bridge for three or four days never reached the McCoy bridge (Or. Abst. 48).

In 1932, 20 c.f.s. were permitted to pass the bridge and did not cross the dry area (Wash. Nar. Test. 142).

The flow in the main stream at the state line continues even though the entire flow of the stream is diverted two and a half miles above at the Red bridge (Wash. Ex. 30, p. 12).

If 20 per cent of the the entire stream flow, when permitted to pass the Nursery bridge, will produce no water at the McCoy bridge, surely the Master's conclusion as to the wasteful nature of the stream is justified.

The Master's conclusion is supported by other evidence not referred to by him, to wit:

The bed of the river is "gravel and loose rock; cobble stones without soil content" for one and a half miles,

and "in the rocky stretch all water that comes down in the summer, sinks" (Or. Abst. 33 and 34).

"Just below railroad bridge about one-half mile the water would disappear. In that stretch, for a mile below the railroad bridge, water sinks more than it does down toward the McCoy bridge" (Or. Abs. 28).

A reference to Washington's Exhibit 18, page 66, shows that in 1933 water was permitted to flow past the dam at the Nursery bridge, as follows:

| | |
|---|---|
| October 31 | 19 c.f.s. |
| November 1 | 21 c.f.s. |
| November 2 | 25 c.f.s. |
| November 3 | 240 c.f.s. |

Yet page 70 of that exhibit shows no difference in the flow at the McCoy bridge until the flood of November 3.

> "From the apex of the alluvial fan at Milton down-stream to the McCoy bridge —— the water table sloped away from the Walla Walla river toward the northeast and the northwest in both June and August, 1933. Therefore the water in the alluvium was percolating away from the river." (Piper's Report, R. 129.) "Clearly the river is a losing stream in this reach." (Piper's Report, R. 130.) "Given the conical form of the water table defined by the contours of June and August, 1933, ground water in the Milton-Freewater segment would percolate northward and northwestward away from the apex of the fan and ultimately would reach the most remote parts of the segment in both Oregon and Washington unless it were sooner discharged." (Piper's Report, R. 130.)

Water sinking in the river channel at the Nursery bridge does not flow along under the stream, but

spreads out over an area extending 2½ miles westerly to the West Prong (Or. Abs. 70 and 71).

Water sinking in the river channel at a point midway between the Nursery bridge and the McCoy bridge does not become underflow of the river, but percolates outward through the alluvium over an area extending a mile westerly to the East Prong (Or. Abs. 70).

From a consideration of the last evidence referred to it is apparent that Washington's conclusion that water sinking in the streambed becomes underflow of the stream (hinted at but not definitely expressed on page 65 of their brief) is not borne out by the facts.

The wasteful character of the Tum-a-lum stream bed is strikingly illustrated by the photograph (Piper's Report, R. 106A).

Washington argues that the distributary channels on the fan are similar and wasteful. In a limited sense they are similar in that they run through and over loose gravel soil, but here their similarity ceases, because they are of much less capacity and have been silted so that their channels are less permeable. (Piper's Report, R. 130); (Or. Abs. 128.)

Their channels have been straightened and cleared (Or. Abs. 42 and 121). The courses of these streams do not shift while that of the Tum-a-lum does. These distributary channels (some so small one can step from bank to bank) are not to be compared with the Tum-a-lum bed of rocks, which varies from 150 to 1,500 feet in width (Master's Report, p. 64). The loss varies with the size of the channel (Or. Abs. 114).

The evidence above referred to shows the waste to be 100 per cent in the Tum-a-lum on quantities up to 25 c.f.s. of water.

The loss on the Crockett and Ford which, when running bank-full, only carry about 25 c.f.s. each (Wash. Nar. Test. p. 89), has been measured and determined at from 15 per cent to 20 per cent (Or. Abs. pp. 42, 48, 60 and 143).

As we understand it, the argument of Washington is that, despite the wasteful character of the stream, water should be taken from the irrigators in Oregon and permitted to run down the Tum-a-lum. 25 c.f.s. so turned down has disappeared and would entirely disappear before reaching Washington.

This 25 c.f.s. used on the gravel fan in Oregon where the average farm area is about seven acres, would irrigate 95 farms supporting 95 families.

To take this water from Oregon and permit it to run to waste in the Tum-a-lum would ruin 95 Oregon farms, deprive 95 Oregon families of support, and would benefit Washington nothing. It would work irreparable injury to Oregon, and farms already established, without corresponding, or any, benefit to Washington.

**Paragraph (4), pages 66 and 67, Washington's Brief.**

This paragraph attacks a part of the statement of the Master's Report setting forth the facts not only of complete diversion of water from the Tum-a-lum during the low-water period but also of non-return of that water to the channel of the Walla Walla river.

The Master's Report is amply supported by the evidence. No evidence to contradict these facts was offered by Washington.

This finding states the number of acres irrigated in Oregon in 1891 as shown by Stipulation No. 3 (R.

19); that the diversion of the waters of the Walla Walla river at the Red bridge was complete and continuous; that all the water was taken and that it did not return directly to the channel of the Walla Walla river through the Ford or Crockett branches which, in such a case, would have conducted any excess back to the main stream.

That the diversion was complete and continuous is established by many witnesses (Or. Abs. Burlingame, pp. 21–22; Forsythe, pp. 22–26; Elba Rogers, p. 28; Schwald, p. 32; Alta Rogers, p. 33; Fee, pp. 40–41; Roeder, p. 41; Perry, p. 47; Mason, p. 54; Wash. Nar. Test., Woodburn, p. 144).

That all of the water was taken can not be disputed. Many witnesses also testified that the Ford and Crockett branches were dry so as not to carry any water back to the main stream (Or. Abs., Elba Rogers, p. 31; Schwald, p. 33; Alta Rogers, p. 34; Roeder, p. 41; Perry, p. 48; Mason, p. 55). The facts were established beyond a question of a doubt.

The measurements cited by counsel were made on the Ford on September 30, 1933, and on the Crockett on December 10, 1933 (Wash. Nar. Test. p. 89). The irrigation season had closed. Most of the weirs were out (Or. Abs., Mason, p. 54). These measurements can not be taken as any evidence of the condition of the channel in June, July, August, and September prior to that time. Nor do such measurements dispute the testimony of witnesses that the Ford and Crockett branches were dry during the dry season and therefore no water returned through those channels to the main stream.

Whether or not those channels of the Ford and Crockett branches could be used to send water down to

Washington is not involved in this case. The fact is, they never were so used.

**Paragraph (5), page 67, Washington's Brief.**

This paragraph contends that the effect of the Master's Finding is to give Mill creek alone to the state of Washington and the balance of the stream system to Oregon. Counsel assumes that the flow of Mill creek is substantially one-third of the available water supply during the months of July, August, and September. Complainant has abandoned all claim for water in all other months. However, the water supply in other months does have a bearing and relationship upon the use of water in the dry season, just as the kind of crops and all other irrigation conditions affect the use of water.

No consideration has been taken of the Touchet, Pine creek, or Mud creek, which are tributaries taken out of this case by stipulation. Besides these, there are Russel creek, Cottonwood creek, Stone creek, Doan creek, the zone of springs and the spring branches around the Mill creek fan, the springs and the spring branches on the Washington side of the state line, and the water flowing across the state line from Oregon to Washington all to be added to the flow of Mill creek.

In investigating the question of the water supply of each state, we are embarrassed by the woeful lack of measurements of any of the streams or spring branches in Washington. A reference to Washington Exhibit 18 shows that in Oregon measurements began on the Walla Walla river in 1903, on the Hudson Bay ditch in 1906, and while this suit has been in progress detailed measurements were maintained at the state

line on all Oregon streams and canals that might be material, and on about 300 wells.

On the other hand, Complainant, who has the burden of proof of showing its necessities and the amount of water it requires from the Oregon side of the stream basin, furnishes a very meager and incomplete record.

Washington's deficiency, if any, should not be guessed at. She should have records to show not only what deficiency she has suffered but also the amount of such deficiency.

Page 166 of Washington's Exhibit 18 shows measurements on Mill creek for 1932. The city of Walla Walla takes water above the place of measurement and any excess diverted is bypassed to the stream below the point of measurement.

Page 168 of the Exhibit shows the city's consumption for August and September, 1933, which was 1,423 acre-feet for August, and 1,320 acre-feet for September. July being a hot month would surely show a consumption of water as great as August. A consumption of 1,400 acre-feet would surely be conservative.

Not having any measurements for 1932, we are compelled to assume the city's consumption, which we do, using the 1933 measurement as a basis, of 1,400 acre-feet for July, 1,423 acre-feet for August, and 1,320 acre-feet for September. On August 13 to 16, 1932, one measurement was taken on 22 springs and spring branches showing a flow of 19.72 c.f.s. (Wash. Ex. 18, p. 217). As this measurement was made at the low time of year, we are assuming that their flow was constant at that amount throughout July, August, and September. Not having a 1932 measurement on the

McEvoy spring branch we are assuming the 1933 flow as also correct for 1932.

With these assumptions, and taking what meager measurements we have—leaving out Pine creek, Mud creek (in Oregon) and Touchet river (in Washington), and not considering seepage losses or the great number of springs in the spring zones of the Milton fan and the spring zones of the Mill creek fan, which were not measured and of which we have no record—in the year 1932 Washington had at least a water supply as shown by the following table:

## TABLE OF WASHINGTON'S WATER SUPPLY IN 1932.

| Name of Stream | Acre-feet In July | Acre-feet In August | Acre-feet In September | Reference to Record |
|---|---|---|---|---|
| Mill creek | 2,790 | 1,900 | 2,040 | Wash. Ex. 18, 166 |
| City of Walla Walla (1933 measurement) | 1,400 | 1,423 | 1,320 | Wash. Ex. 12, Report of Referee, page 2. Wash. Ex. 18, 168 |
| Reser creek | 19 | 1 | ..... | Wash. Ex. 18, 176 |
| Russell creek | 22 | ..... | ..... | Wash. Ex. 18, 177 |
| McEvoy spring branch (1933 measurement) | 296 | 201 | 217 | Wash. Ex. 18, 180 |
| 22 miscellaneous springs | 1,240 | 1,240 | 1,200 | Wash. Ex. 18, 217–218 |
| Water received state line Walla Walla river | 485 | 327 | 270 | Wash. Ex. 18, 77 |
| Kelly ditch | 5 | 5 | 2 | Wash. Ex. 18, 80 |
| Wendler, Eiffert and Dyer ditches | 184 | 178 | 204 | Wash. Ex. 18, 82 |
| Big Spring creek | 433 | 199 | 308 | Wash. Ex. 18, 86 |
| Hoffman ditch | 54 | 47 | 64 | Wash. Ex. 18, 88 |
| East Little Walla Walla | 132 | 48 | 213 | Wash. Ex. 18, 90 |
| Clark-Overby ditches | 7 | 10 | 12 | Wash. Ex. 18, 93 |
| Wells ditch | 45 | 1 | ..... | Wash. Ex. 18, 95 |
| Knopf ditch | 4 | 3 | ..... | Wash. Ex. 18, 97 |
| West Little Walla Walla | 255 | 146 | 146 | Wash. Ex. 18, 100 |
| Totals | 7,371 | 5,729 | 5,996 | |

**Grand total, 19,096 acre-feet.**

In the above tabulation, measurements of Yellowhawk and Garrison creeks, distributaries of Mill creek, are not counted. Neither is the measurement on the East Little Walla Walla stream near its mouth counted, because we took its measurement at the state line. However, the measurements on the East Little Walla Walla at its mouth, three miles from the state line, show a run-off in July of 682 acre-feet, in August of 286 acre-feet, and in September of 904 acre-feet (Wash. Ex. 18, p. 181), as against 132 and 48 and 213 acre-feet in those respective months at the state line. This shows an increase in addition to water used for irrigation of 550, and 238, and 691 acre-feet respectively.

In Oregon the water supply from streams is gauged by Stations No. 215 and No. 216 on the Walla Walla river (Wash. Ex. 18, pp. 58 and 62), which show for the year 1932 a run-off for July of 7,645 acre-feet, for August 5,931 acre-feet, and for September 5,972 acre-feet, or a grand total of 19,548 acre-feet. Comparing this with the Washington run-off of 19,096 acre-feet a difference is shown in the water supply of less than 500 acre-feet, or a flow of less than three c.f.s. during the three-month period.

Considering the incompleteness of the Washington records on its water supply, and the fact that the streams passing from Oregon to Washington are gaining streams in Washington (Or. Abs., Piper 74, R. 130; Wash. Ex. 18, pp. 58, 62, 70, 77), it is safer to assume that Washington's water supply is now greater than Oregon's than to take counsel's assumption that it is only one-third to Oregon's two-thirds of the water supply. Since counsel for Washington ignores so many sources of water supply in his calculations of a division of one-third and two-thirds, no decision in this case could be safely based upon it.

**Paragraph (6), page 67, Washington's Brief.**

This paragraph merely states Washington's conclusion that in determining the rights of the two states the court should give consideration to certain alleged losses in natural stream channels above Milton.

The canyon, where the river runs above Milton, is narrow, steep, and with steep rock walls, floored with basaltic rock covered with a thin layer of highly permeable soils (Or. Abs. Harding, p. 124; Mason, pp. 52 and 53; Perry, p. 48) (Wash. Ex. 15) (Piper's Report, R. 82). The irrigated land lies close to the stream (Or. Abs. Mason, p. 53).

Washington offered no evidence showing or tending to show what, if any, amount of the water of the stream was lost by the use of the channels.

Oregon conducted experiments which showed that the water diverted, and, not used up by plant life or evaporation, immediately returned to the stream (Or. Abs. Mason, pp. 52 and 53; Perry, p. 48).

The use of these natural channels could have no appreciable effect on the stream system.

The farms are so small in area, and the river so changing through sudden floods and freshets, that no farmer could go to the expense of constructing permanent diversion works or canals strong enough to withstand the stream (Or. Abs. Mason, p. 53).

One and one-half c.f.s. seeping under the dam and two c.f.s. turned in to augment it supplied all of the up-river users because of prompt percolation back to the stream (Or. Abs. Perry, p. 48). The matter covered by the exception is trifling.

**Paragraph (7), page 68, Washington's Brief.**

This paragraph is devoted to a statement of Washington's contention that rights in Oregon are not vested beyond the amount that could be beneficially used (which is undoubtedly true), and to a claim that because the state engineer's office in Oregon has adopted a rule limiting all permits for the use of water to one-half miner's inch per acre, this shows the state engineer to have officially determined that one-half miner's inch per acre is the maximum amount that can be beneficially used.

The state engineer's rule is not an official determination and, if it were, would be entitled to no weight because Washington in its statement of issues on duty of water (R. 49 and 50) concedes that amounts as high as one miner's inch per acre are required for most of the land on the gravel fan, and every witness (farmer and expert) testified that more than one-half miner's inch per acre was required for most of the land.

Since counsel discusses Duty of Water later in his brief, we reserve our discussion until we answer that part of his brief.

**Paragraph (8), page 69, Washington's Brief.**

This paragraph complains that the Master has given no controlling weight to Oregon's practice of using waste water.

In the chief portion of the land on the gravel fan the land is underlaid by a strata of cement gravel comparatively impervious to water, covered with a layer of loose round gravel with almost no soil content and from eight to 33 feet in depth. On top of this loose

gravel is from one to three feet of gravel mixed with soil. (Or. Abs., Forsythe, p. 26; Elba Rogers, p. 29; Alta Rogers, p. 36; Roeder, p. 44; Perry, p. 50; Harding, p. 118; Powers, p. 97.)

In such soil, water is lost in deep percolation so that to irrigate it the farmer must get over the entire length of the furrows speedily with a large head of water and can not permit it to run over long periods of time (Or. Abs., Harding, p. 118; Rogers, pp. 38 and 39; Roeder, pp. 43 and 44). By this practice there is often some run-off at the end of the furrow which is picked up in a tail ditch and used on lower land instead of permitting it to waste by evaporation or deep percolation (Or. Abs., Rogers, p. 31; Alta Rogers, pp. 35 and 39; Roeder, p. 43); (Stip. 3; R. 14).

Harding says this practice is proper, reasonable and desirable (Or. Abs. p. 113). We submit that it is.

The water having been spread on the land and away from the stream could not be returned to the stream. The record does not show that any farm in the area is irrigated entirely by waste water. It is only used to supplement other sources of supply.

Washington's Exhibit 1, pages 167 to 198, shows that there are 159 users of water from the Milton ditch. Water to supply these rights is turned in at the head of the ditch. If on any day certain of the users fail to irrigate, water runs out the tail of the ditch, which is at a point almost a mile from any stream. To prevent the waste of this water some farmers constructed the Finis ditch, leading from the end of the Milton ditch to a point about two miles west. In the original 1912 Decree (Or. Ex. 31, pp. 151 and 152) and in the last Oregon Decree (Wash. Ex. 1, p. 74), there were

107.5 acres of land awarded the right to use such surplus water as might flow past the end of the Milton ditch. No water is diverted from the river for the purpose of supplying such surplus water, however, and no one of the places is entirely irrigated by such water. Each ranch is irrigated by a well and the surplus water merely supplements the supply from the well and reduces the amount pumped from the ground water.

No right of the state of Washington is violated by this use of surplus water from the Milton ditch or by the use of run-off water on lower lands. The practice in all cases prevents waste and does not increase the demand on the river.

Washington's witness says it is beneficially applied (Wash. Nar. Test., Chase, p. 16).

**Paragraph (9), pages 69 and 70, Washington's Brief.**

This paragraph attacks the finding of the Master as to wells. This finding is fully supported by the evidence. There is no testimony showing the use of water from wells on any other land than that of the owner.

Perry, the watermaster, testified that none of the irrigation wells furnish water for land other than that of the owner (Or. Abs. p. 49). Forsythe uses four wells (Or. Abs. p. 26). Elba Rogers uses one well (Or. Abs. p. 29). Alta Rogers rotates with all his water except the well (Or. Abs. p. 39). The water in these wells are percolating waters. Throughout his report Piper speaks of the ground water as "percolating". For example: "Ground water in the Milton-Freewater segment would percolate northward and northwestward." (R. p. 130.) Percolating water belongs to the owner of

the soil and he may make reasonable use of it upon his overlying lands.

The pumping from wells is used to supplement irrigation from the stream. In 1932 substantially 9,000 acre-feet was pumped from wells. Powers testified that the soil capacity of the gravelly soil within the root zone of the trees and crops was from two to two and one-half acre-inches. (Or. Abs. p. 97.) Carter (Or. Abs. p. 137) and Harding (Or. Abs. p. 118) say that it takes five to six acre-inches to give an acre of such ground one irrigation. The loss by deep percolation which then becomes a part of the ground water would be from two and one-half to four acre-inches out of each application of water. Harding says such loss is 50 per cent to 60 per cent (Or. Abs. p. 119). Out of 9,000 acre-feet pumped in 1932, by this deep percolation, 4,500 acre-feet to 5,400 acre-feet immediately went back and became a part of the ground water of the land. Piper testified that in wells near the river the water table rose and fell with the river (Or. Abs. p. 72). He further says (Or. Abs. pp. 72–73):

> "In some wells the table rises in response to the river, and the spreading of water over crop land near the wells causes a rise; rainfall also does. The water table falls as pumping becomes general and as the river declines. (R. 789.)
>
> "The effect of evaporation and heat would be slight; more than one of the agencies causing the table to fluctuate are active at the same time. Irrigation begins while there is water in the river. At the same time the river was rising and wells were rising with the river, water was spread for irrigation, and it is impossible to say what fraction of the total rise is due to the river and what to irrigation. The same is true of the fall. The pumps are turned on as the river declines, the depression of

the table, due to pumping begins soon after the water table begins to decline, because the freshet had passed, and as the peak of the wave of the water table had passed, and our data does not justify an estimate of the total fluctuation due to the several causes because they are working concurrently. (R. 790.)

"The depressions, or flattening of the water table from pumping, causes the water table to steepen to the south so that it moves northward more rapidly. It does not destroy the general form of the table. (R. 791.)

"A slightly greater portion of the total movement would be in the eastern half of the fan; a slightly greater portion. It would tend to cause more flow to the north than to the west—relatively."

The ground water supply and the effect of pumping upon it was studied by Mr. Piper, a geologist connected with the United States government. This study was made at the request of both parties. The result of his study is embodied in a report printed in the record (R. 72, et seq.). Plate 5 (R. 142A) prepared by him graphically shows the rise and fall of the ground water. On this plate, by various colors of pink, the ground water on the Milton fan is shown to have fallen from five to 25 feet during the irrigation season. At the state line, however, by colors in blue, the plate shows that the ground water rose five feet between the 20th of June, 1933, and the 29th day of August, 1933.

This territory in which the water table rose is the district from which Washington secures the only water supply she has ever had from Oregon during the dry season. The rising of the water table shows that pumping in Oregon does not lessen their supply. The gradient of the water table throughout the Milton-Freewater

segment is so steep that pumping and irrigation is not large enough to materially change the form of the water table. (R. 131.)

**Paragraph (10), page 71, Washington's Brief.**

This paragraph is apparently designed to express dissatisfaction with the Master's Report because he did not attempt to define, divide, and regulate the use of waters as between the two states during that season of the year when there is admittedly more than enough water in the stream to supply all rights and when water is running to waste into the Columbia river because there is no use for it (Or. Abs., Mason, pp. 52, 56, 57, 58; Wash. Nar. Test., Barney, p. 36).

The quoted portion of Oregon's contentions sufficiently discloses the fallacy of Washington's statement that Oregon claims Washington's use of any water to be by sufferance. It there appears that Oregon claims the prior right to use "all or so much" of the waters as is required to supply its rights. If "all" is required for this purpose, we claim it. If only part is required, we claim only "so much" as is required.

The last diversion from the Tum-a-lum river in Oregon is the Hudson Bay canal, and it is at this point that the Tum-a-lum river is dried up each year. The Milton-Freewater and Hudson Bay Irrigation Company has a right for 75 c.f.s. of water with a priority of February 16, 1903 (Wash. Ex. 1, p. 58). It is evident that whenever the flow of water in their canal is cut below 75 c.f.s. all of the Oregon rights with a priority of 1903 or later are entirely cut off and no water is being permitted to flow down the Tum-a-lum past the Nursery bridge.

When there is no shortage of water in Washington there is no regulation (Wash. Nar. Test., Barney, p. 36). It must follow that until the Washington watermaster begins to regulate the water each year, there is no shortage of water in Washington. The dates of the beginning of regulation are established by Washington Exhibit No. 27 (R. 203 to 207) as follows: 1929, June 1; 1930, June 10; 1931, May 26; 1932, June 27; 1933, July 9.

Washington Exhibit 18, pages 126 to 131, gives the measurements of the water flowing in the Hudson Bay canal for the corresponding years and proves that in each of the years the Hudson Bay Company was cut below its 75 c.f.s. long before there was any shortage or need of regulation in Washington.

It follows that there was more than enough water in Washington streams to supply all Washington rights for some time after the shortage in Oregon had compelled the cutting off of certain rights each year.

Since Washington has no need to draw upon the stream in Oregon until after there is not enough water to supply Oregon rights, and since the Master determined the Oregon rights had the prior claim, there was no necessity for his going further in defining the respective rights of the states during the season of surplus flow.

This argument is approved by the finding of the Master (Master's Report, p. 64), which is not excepted to.

**Paragraph (11), page 72, Washington's Brief.**

This paragraph complains that the Master's Report by implication approves the Oregon contention

to the effect that separate administration of the stream in Oregon has been such that the Oregon portion of the stream should be considered a separate stream.

Since Washington later in its brief argues the law on this question we will reserve our comments on this paragraph until that part of the brief is reached. However, we will point out that the statement, "Its only source of water supply is from the drainage of the North and South Forks, the main stream and small tributaries above the Oregon-Washington state line" is contrary to fact. As is demonstrated by Washington Exhibit 17 (R. 142C), Mill creek, Cottonwood creek, Reser creek, Russell creek, Yellowhawk creek, Stone creek, Garrison creek, Doan creek and many others all contribute to the supply of the stream in Washington.

**Paragraph (12), page 73, Washington's Brief.**

This paragraph is covered by our comment on paragraph (4) above.

**Paragraph (1), page 73, Washington's Brief.**

This paragraph complains that the Master in commenting upon the taking of water from Mill creek in Oregon by the city of Walla Walla did not state that it was not feasible to use that water in the irrigation of Oregon lands.

The comment of the Master was part of his finding:

> "It must be quite evident that the agricultural and industrial development of the area involved has proceeded without regard to state lines."

The fact that Oregon could not well use the water at that place for irrigation is unimportant.

The fact that Walla Walla takes from Oregon and uses a substantial amount of the water supply of the stream system is important. It bears upon the questions of equitable apportionment and equality of right.

**Paragraph (2), page 73, Washington's Brief.**

This paragraph complains that the Master in his report did not give a detailed review of the summer flow of the stream, but contented himself with expressing his finding that it was sporadic.

That the Master's conclusion is sustained by the record is shown by our argument above in answer to paragraph (1), pages 60 and 61 of Washington's brief.

**Paragraph (3), pages 73 and 74, Washington's Brief.**

This paragraph complains of the Master's Finding:

> "That during the period of high water, the Washington users do not need to impinge on the Oregon users."

This statement is explained by the Master in the paragraph following it on page 53 of his report.

The conclusion of the Master is supported, as is shown by our argument above in response to paragraph (10), page 7, Washington's brief.

The physical conditions there disclosed are such as to render counsel's fears groundless. There is water in the Washington streams sufficient to supply all of Washington's rights long after the shortage in Oregon has compelled the cutting off of certain rights.

**Paragraph (4), page 74, Washington's Brief.**

This paragraph attacks the Master's Report for failing to show the common ownership of the Hudson Bay ditch and the Gardena canal. The Hudson Bay water right was initiated in 1903 (Wash. Ex. 1, p. 55). By 1906, as much as 63.5 c.f.s. were diverted and used (Wash. Ex. 18, p. 120).

Burlingame, one of the organizers of the Gardena project, became interested in the Hudson Bay in 1911 (Or. Abs. 21) Work, looking towards the initiation of the Gardena rights, began in 1892. No great amount of water was diverted until after the building of the syphon in 1905 (R. 29). At the time Burlingame became interested in the Hudson Bay it was fully developed. Long before becoming so interested and at the time of the completion of the Gardena canal (1905) he discovered a shortage of water and went to see about it (Or. Abs. 21). The notice complained of by this paragraph began at that time and there was no protest.

Then in 1911 when he bought control of the Hudson Bay the right was acquiesced in and the complete diversion of the water was left as before. In fact the promoter of Gardena was so satisfied with the soundness of the Hudson Bay right, that in 1918 or 1919 a large amount of land irrigated from the Gardena canal was released from that project and thereafter irrigated from the Hudson Bay (R. 21). By so doing, the water right for that land was apparently changed from an 1892 right as given by Washington's decree to a 1903 right as given by the Oregon decree. The common ownership and management therefore did not affect the methods of diversion and came so late in the history of the development of the two projects that their rights are not affected thereby.

**Paragraph (5), pages 74 and 75, Washington's Brief.**

This paragraph complains of the Master's Finding on pages 65 and 66 of his Report that when the first protest was made by Washington the Gardena canal was receiving all and more of the water than it was entitled to, and that the Washington users were then unregulated and were not regulated until 48 days later.

On page 64 of his Report, the Master found:

> "The high water in the Washington tributaries to the Walla Walla river during the period of flush flow was sufficient to supply the demands of all of the Washigton users, and after the secondary rights on the Oregon side were all shut off, the Washington users were still unregulated and using such quantity of water as their necessities might dictate (Barney, Wash. Abs. p. 36; Wash. Ex. 37; Wash. Ex. 18, p. 11 et seq., p. 120 et seq.)"

This finding is not excepted to and shows that there was no necessity of the Master detailing anything with respect to the matters counsel suggests.

We again see the vice of lifting one sentence or paragraph from the Master's Report and criticizing it without reference to his other findings.

**Paragraph (6), pages 75 and 76, Washington's Brief.**

This paragraph complains that the Master in pointing out that the actions of the manager of the Gardena project in expending large sums of money in attempting to secure a water supply from sewage and wells without making any demand on Oregon for the release of any portion of the stream flow, and in noting that such conduct is inconsistent with Washington's present contention that she at all times has had and claimed a

right to take from Oregon a portion of the stream flow in Oregon during the low-water season, should have found that, while such expenditures were being made, a large part of the Gardena supply came from Oregon streams.

We have several times referred to the evidence showing that, from 1880 on, the entire flow of the stream was (during the dry season) diverted at the Red bridge and the Nursery bridge, and the Master so found (Master's Report, p. 54).

The only water from Oregon that has or could have supplied any part of the Gardena rights during the dry season was water rising at and below the inner zone of springs (see testimony quoted on page 57, Master's Report).

The Master's Report, page 58, does find that this spring flow goes to Washington. His report covers the very matter counsel claims to have been omitted.

**Paragraph (7), page 76 of Washington's Brief.**

This paragraph attacks the finding of the Master that after the recession of the high water none of the waters arising above the Red bridge were ever applied to a beneficial use in Washington. The exception claims a failure to consider the natural drainage. It complains that the Master's statement, taken alone, is too broad.

Complainant has failed to consider the balance of the finding where consideration is given to drainage. In the very next sentence to the part excepted to, the Master says:

> "The record further shows, as herein elsewhere cited, that quantities of water as much as 25 second-feet, half of the Gardena right after July 1st, turned

over the dam at the Red bridge completely sank into the river bed. There is no convincing evidence that water so sinking is again available for use to the Washington appropriators. There is no showing in this case that the diversion of the water at the Red bridge and its application to the irrigation of lands adjacent to the river is more detrimental to the users within the state of Washington than to have the same amount of water turned past the Red bridge to sink into the channel of the Tum-a-lum river between there and the McCoy bridge.

"The testimony of witness Piper, who, for the parties hereto made a study of the subject of underground water, would indicate that the use of the water on the lands to the west of the Tum-a-lum river does not remove the return water materially more to the west than would occur if the waters were permitted to sink in the channel of the Tum-a-lum river. (Or. Abs. pp. 74, 75.)"

The Master in his report therefore did consider the natural drainage and, as heretofore shown, his finding is amply supported by the testimony.

**Paragraph (8), pages 76 to 79, Washington's Brief.**

This paragraph complains that the Master after noting in his report that the Washington decree, although it awarded Gardena a priority of 1892 by express provisions, made the Gardena right inferior to certain rights having a later date of priority, concluded that the Washington court in so doing must have proceeded upon the theory of *U. S. v. Haga*, 276 Fed. 41.

Whether or not the Master's opinion as to the theory of law, in the mind of the Washington court, is correct, is unimportant in determining the rights of the contending states.

The important feature is that the court which decreed the Gardena priority made its right inferior to those of later priority.

Since the Washington court in its decree gives, as its reason for so limiting the Gardena (Walla Walla Irrigation Co.) right, the provisions of the decree in the case of *Lowden Co. et al. v. The Walla Walla Irrigation Company* (see language quoted page 77 Wash. brief) there is no basis of fact for counsel's suggestion that a dual system of rights (riparian and appropriation) caused the limitation.

*U. S. v. Haga*, 276 Fed. 41, quoted by the Master on page 73 of his report, presents an exact parallel to the situation of the two states with respect to the dry section of the Tum-a-lum and the Little Walla Walla distributary system, and is directly in point on that feature of the case.

**Paragraph (9), page 79, Washington's Brief.**

This paragraph also attacks the finding of the Master that Gardena has never used the waters of the Walla Walla river rising above the Red bridge during the low-water period and that during the high-water season their rights were adequately supplied by the Washington tributaries. Citation is made to testimony of witnesses for the state of Washington to the effect that the Gardena canal was never dry from 1917 to 1922, and that Gardena took its water from the main stream. The Gardena canal diverts water from the main stream in Washington just below the mouth of Yellowhawk creek. At all seasons there is no doubt but that there has been a supply of water in the main stream at that point. The water running at that point, not

supplied by Washington tributaries, was supplied from water rising in the zone of springs below the dry stretch of the Tum-a-lum and the distributaries of the Little Walla Walla. Streams arising from these springs are gaining streams in Washington. Irrigation may to some extent affect those springs, but did not create them (R. 139).

At no place does counsel cite any testimony that during the dry season any of the water running in the main stream at the point of diversion by the Gardena canal, rose above the Red bridge. The uncontradicted testimony of many witnesses, heretofore referred to, shows the extent of the dry stream beds at that time of year.

**Paragraph (10), pages 80 and 81, Washington's Brief.**

This paragraph complains that the Master's statement to the effect that the Washington court found the use of water in Oregon was a benefit to Washington users was broader than justified and should have been limited to a finding that only "early" use when the supply was "abundant" benefited Washington users.

Proper analysis of the paragraph quoted from the Referee's finding on pages 74 and 75 of the Master's Report shows that the Referee not only found the "early" use desirable but found that any use was a benefit by feeding the springs and streams which supply Washington users.

Just as the water applied to Oregon lands on the gravel belt during the "early" season enters the ground water and feeds the springs which supply water to Washington and thus benefits Washington, so does water applied to these lands in the late season.

**Paragraph (11), page 81, Washington's Brief.**

In this paragraph exception is taken to the finding of the Master that the intention of Gardena to appropriate water of the Walla Walla river rising above the Red bridge is not shown by the evidence or the conduct of the claimants.

Inferences can only be drawn from facts. When Gardena was promoted, no investigation of the water supply was made (Or. Abs. 21). When the canal was completed about 1905 interested parties began to go up the river looking for water to turn down (Or. Abs. 21). No water was turned down as a result of these visits, and no protest was made as to Oregon's use of it. In 1905, for Gardena, the Irrigation Company began spending money to increase their water supply. They investigated artesian wells, reservoir sites and the sewage water from the city of Walla Walla. During a series of years, they spent substantially $50,000 for that purpose. (Stip. 5; R. 23–45; Or. Abs. 18–23). People interested knew that Oregon was diverting the water. The state of Washington took charge of Gardena in 1917, and divided the land into class "A" (2,245 acres), and class "B" for the balance of the land (Wash. Nar. Test., p. 69). Priority in the distribution of water was given to class "A" lands. The irrigators rotated their use of water, and in summer watered only their perishable stuff of some 200 or 300 acres (Wash. Nar. Test., p. 59). During all this time, neither the state of Washington nor the irrigators interested made any protest against Oregon's use nor claim to any water rising above the Red bridge. Certainly the acts and conduct of complainant and her citizens substantiates the Master's conclusion.

**Paragraph (12), page 82, Washington's Brief.**

This paragraph complains of an alleged "implication" that might be given a sentence from the Master's Report.

One of Washington's chief grounds of complaint was Oregon's use of large quantities of water in irrigating No. 3 lands on the gravel fan.

These lands appear on Washington's Exhibit 15, colored in orange. A glance at this exhibit shows soil of this class to lie in both Oregon and Washington.

Oregon offered a mass of testimony to show that the use of a flow of 1½ miner's inches of water to the acre was required to successfully irrigate lands of this class. The testimony was from farmers, irrigation experts, and soil experts, and covered the operation of test places on this identical class of soil.

Washington offered no witness who had ever successfully irrigated land of that class with a lesser amount of water than Oregon contended for—and this despite the fact that she had the identical type of soil within the area under investigation in this case.

The Master commented upon the failure to produce such evidence as "significant".

Counsel for Washington complains of this comment because the Washington duty of water was not under attack, and because a Washington witness, Larson, said that some such land in Washington was farmed. His conclusion and those of Oregon's witness, Humphrey (Or. Abs. p. 92), are at marked variance, and Larson's statement does not overcome the significance of Washington's failure, on this most important feature of her case, to call even one witness who had success-

fully irrigated such land with a lesser amount of water. Her's was the burden of proof. Having the same land in her own territory she could have produced such proof if it was a fact. She failed to do so. Truly it is "significant".

It is also significant that every practical farmer from Washington, with land even better than class 3, and who testified upon the subject, testified that after the Washington duty of water was fixed and enforced he had to change his crops, cut down the area of land irrigated, or entirely give up the irrigation of his land (Wash. Nar. Test., Hammer, pp. 24 and 25; Ross, p. 28; Williams, p. 33; Dill, p. 44; Cundiff, p. 46; Hastings, p. 47; Sams, p. 48; Danielson, p. 50).

**Paragraph (13), page 82, Washington's Brief.**

The Master's Finding (Master's R. 108–109) contains the statement that the water pumped from wells is used exclusively upon the tract of land upon which the well is located, and then states that if the Washington theory of the underground water being a part of the stream is adopted then the water user would have the right to recapture.

The state of Oregon, through its officials, the watermasters, have distributed the water to the water users on the Milton fan since 1911.

In *Ide v. U. S.*, 263 U. S. 497, cited by counsel, the United States was permitted to recapture seepage water for its irrigation. The same principle would apply here where the state of Oregon permits its irrigators to recapture seepage water which has once been used for irrigation.

The water in the wells rises with the beginning of irrigation (Or. Abs. pp. 29, 36). Well water is just as much irrigation water as is stream water. Its use, therefore, would be beneficial, economical, and a saving of waste. Oregon's claim to this water, as recognized by the Master, is based upon the use of percolating water upon the lands overlying it. The landowner finding the water there has the right to use it. (*Meyer v. Tacoma Light & Water Co.*, 8 Wash. 144, 35 P. 601.)

**Paragraph (1), pages 83 to 85, Washington's Brief.**

This paragraph complains that the Master's Report gives little attention to an alleged lack of regulation on the river above the canyon at Milton.

This part of the stream is regulated (Or. Abs. Mason, p. 52 and 53).

The same complaint appears in his paragraph (6), page 67, Washington's brief, and is covered by our argument in answer to that paragraph which shows that regulation or lack of regulation at that point is unimportant. Physical conditions are such that an excess diverted promptly re-enters the stream by percolation.

The matter merited no more attention than what was given it by the Master and could have no appreciable effect on the Washington rights.

**Paragraph (2), page 85, Washington's Brief.**

This paragraph objects because the Master gave no review of the evidence concerning an alleged waste of the water at the Milton ditch intake and the use of surplus water from the tail of the Milton ditch by picking it up in the Finis ditch.

In our answer to paragraph (8), pag 69, Washington's brief, we have heretofore discussed the Finis ditch situation and we will not repeat.

The rights under the Milton ditch are set out in Washington's Exhibit 1, pages 167 to 196. They range in priority from 1872 to 1892.

The original head of this ditch and its diversion works was at what was then the main stream channel at Thorne street in Milton (Or. Abs. Mason, p. 54) where its headgate now is.

Freshets changed the course of the main channel of the stream, but the Milton ditch (as was its right) continued to take its water at the same point in the stream by diverting a sufficient amount from the new to the old channel and constructing a flume where the old channel was too badly washed out to carry the flow (Or. Abs. Mason, p. 54). All the surplus water thus carried to their headgate is bypassed into the Miller flume and thus carried to the Little Walla Walla (Or. Abs. Mason, p. 54).

There is no showing that any substantial loss results from this practice.

An irrigator has a right to continue to take his water at the original point of diversion from the stream and to require that the stream flow "as it was wont to flow", for that purpose (Kinney on Irri. and Water Rights, 2d Ed. Vol. 2, p. 1520, § 864).

**Paragraph (3), page 85, Washington's Brief.**

This paragraph asserts that the flow of the streams in Washington in recent years had diminished, while in 1932 and 1933 the measurements showed an increase in Oregon over former years.

This is an attempt to use the guess of witnesses as to the flow in Washington as against the measurements in Oregon. Community improvements, road building, drainage ditches and general irrigation improvements affected the flow of streams at different points. Big spring branch and East Little Walla Walla were especially affected. The main highway between Milton and Walla Walla was impassable before the roadway was drained and paved. Tiling was placed through the center of the southwest quarter of Section 11, Twp. 6 North, Range 35 E.W.M. which drained the water supply of Big spring branch which runs into the East Little Walla Walla and conducted that water supply into the main Walla Walla about 80 rods distant (Or. Abs. Roeder, p. 45). This reduced the water supply of Ross, Hammer and German. Dr. Powers testified that he had observed the water supply of the Northwest over a period of years and that there is a general decrease in the water supply. We have had a period of dry years, according to hydrographic records (Or. Abs. p. 100).

Owing to the lack of measurements in Washington the variation in flow of streams for different years can not be compared. There are measurements for a number of years of the diversions of the Gardena canal (Wash. Ex. 18, pp. 11–21, incl.). These measurements show a variation of diversion according to the wet and dry years. In 1917, Gardena began its diversion in July with 65 c.f.s. which gradually decreased to 22.4 c.f.s. on July 31, and then to 18 c.f.s. on August 31, increasing to 32 c.f.s. the last of September. In 1918 it started at 33.2 c.f.s. and maintained almost a steady flow, ending in September with 25.1 c.f.s. In 1919, it began at 26.9 c.f.s., went down to 5.5

c.f.s. in August and ended in September with 22.6 c.f.s. In 1922, it began at 34.5 c.f.s., went down to 16.1 c.f.s. in August, and ended in September with 29.4 c.f.s.

In 1927, July started with 47 c.f.s. and was dry at the last of the month. In 1929, July started with 28 c.f.s. or more and was dry at the middle of the month. In 1930, July started at 40 c.f.s. and was dry on the 28th. 1931 started July at 41 c.f.s. and was dry on the 26th. In 1932, July started with 61 c.f.s., went down to 6.7 c.f.s. on August 8 and then increased to 16 c.f.s. on August 29 with the 30th dry. In 1933, July started with 94 c.f.s., decreased to 15 c.f.s. August 17, and then increased to 24 c.f.s. August 31 with September 1 dry.

In dry years the stream is lower in the dry season than in other years. The minimum flow should show those dry years.

The table given by counsel on pages 16 and 17 of his brief shows minimum flows in 1918 for July, 105 c.f.s.; August, 105 c.f.s.; and September, 108 c.f.s. In 1919 for July, 112 c.f.s.; August, 103 c.f.s.; and September, 112 c.f.s. The Gardena diversion was more in July and September, 1919, than in those months for 1918 and less in August. In 1922 the minimum flow was 127 c.f.s., 123 c.f.s., and 125 c.f.s., respectively, and Gardena had a corresponding increase in diversion. In 1927 the minimum flow for those months was 88 c.f.s., 80 c.f.s., and 97 c.f.s., respectively—a very dry year, and Gardena went dry in July. In 1929 the minimum flow was probably about 68 c.f.s. (Wash. Ex. 18, p. 46), and Gardena went dry July 15. In 1930 the minimum was 59 c.f.s., 67 c.f.s., and 67 c.f.s., respectively. Gardena went dry on July 29. In 1931 the minimum was 82 c.f.s., 80 c.f.s. and 80 c.f.s. respectively, and Gardena went dry on July 26. In 1932 the minimum

was 109 c.f.s., 97 c.f.s., and 97 c.f.s., respectively, and Gardena had 24 c.f.s. when it closed down the last day of August. In 1933 the minimum was 118 c.f.s., 108 c.f.s., and 109 c.f.s., respectively, and Gardena closed down the last day of August with 25 c.f.s.

From these measurements it appears that the water supply in Washington increased in 1932 and 1933 in spite of the oral testimony of witnesses to the contrary. The inference of Complainant is not founded on facts.

**Paragraph (4), pages 86 and 87, Washington's Brief.**

This paragraph complains that the Master's Report fails to give significance to the fact that after 1929 the user's of water on the Mill creek tributaries were compelled to surrender water for the benefit of Gardena.

On page 63 of his report the Master notes this very fact.

There is no testimony in the record to support counsel's statement that any decrease in the flow of streams across the state line was due to an increase in Oregon consumption.

There is no record of measurements to prove there was any such decrease—only testimony by some Washington partisans that in their opinion certain streams showed a smaller flow in recent years. At what point in Washington they determined the flow to be smaller does not appear. The decrease they observed may have been due to increased Washington consumption.

Stipulation No. 3 (R. 20 and 21) shows that on the West Prong, from 1917 to 1931, Oregon irrigated 51.25 acres additional, while in the same time and from the same stream Washington irrigated 137 additional

acres. There is no compilation in the record from which the increases on the other spring branches can be readily compared.

If there was a diminution of the flow in these spring branches it was probably due to our cycle of dry years (Or. Abs. Powers, 100).

At any rate, the one stipulation in the record covering the subject does not support counsel's assumption that an increased consumption in Oregon was the sole cause of any decrease in flow.

The Master properly confined his findings to proven facts.

**Paragraph 4), page 87, Washington's Brief.**

This paragraph suggests that instead of dismissing the cause this court should enter a decree incorporating the provisions of paragraph II (4) of Stipulation No. 2 as to Pine and Mud creeks (R. pp. 9 and 10).

Measurements on Pine creek at its mouth (Wash. Ex. 18, p. 202) show that at all times measurements were taken water was wasting into the Walla Walla after all rights in both states were supplied.

Measurements at the mouth of Mud creek (Wash. Ex. 18, p. 201) show the same situation there.

The record does not disclose and there never has been any trouble between the states over the waters of these streams.

We suggest the matter is not of such "serious magnitude" as to require this court to retain jurisdiction for the entry of a decree on a noncontroversial matter.

**Paragraph 5), page 87, Washington's Brief.**

This paragraph suggests that even though the Master was correct in his finding (Master's Report, pp. 67 to 72) that no sufficient diligence had been exercised so as to authorize the application of the doctrine of relation to the Gardena appropriation, under the Washington statute then in force, still it might have been possible that the appropriators were not proceeding under the statute. Counsel complains that the Master should have given fuller consideration to the character of the Gardena appropriation. He states that in an appropriation under the statute, the date of the right would be the date of the filing of the notice and that in the case of an appropriation, not under the statute, the priority would date from the beginning of construction. In this case the notice was filed and construction started in 1892.

The point is not important, however, because under either method diligence is requisite to the application of the doctrine and the appropriation can not be consummated and the doctrine invoked until the water appropriated has been actually applied to the land within a reasonable time.

In this case the Master found, first, that the appropriators had not acted with such diligence as to justify the application of the doctrine of relation; and, second, that they never had applied to the land any of the waters arising above the Red bridge in Oregon during the dry season and, therefore, had never consummated any appropriation of such water; and, third, that since for 12 years before 1892 no water arising above the Red bridge in Oregon had been permitted to flow down to Washington, this circumstance taken in connection

with the conduct of the appropriators, showed that they never intended to appropriate waters arising above the Red bridge and without intent to appropriate there could be no appropriation.

The matters set out from paragraph (6), page 89, to the heading "Jurisdiction" on page 91 of Washington's brief require no answer at this place in our brief.

## SUMMARY OF ARGUMENT.

Oregon concedes this court's jurisdiction over a controversy between states if it is of sufficient magnitude to warrant interference.

In this case, although Washington appears as a sovereign, its rights are so linked with and dependent on those of its water users as to be limited by any adverse rights heretofore acquired by Oregon or its citizens.

The rule of decision is "Equality of Right". The result of the decision—not the formula by which it is reached—is the chief consideration.

For more than 50 years Oregon, with Washington's knowledge and without protest by Washington, has so used the waters of the Walla Walla river as to entirely exhaust the surface flow of the stream during the dry season at the Red bridge five miles south of the state line. A large and valuable development is based on this use of water. Development in Washington has been made without the use of any water of the stream in Oregon save that arising in the springs in the area about two miles south of the state line, and not required by Oregon irrigators. This practice in division and use

of waters has grown up normally as the economical division and distribution of water on the lands where it can be most advantageously used. Because of the wasteful nature of the stream channels, water turned down from Oregon would not reach Washington, but would sink. To limit the long-established use of water in Oregon would materially injure Oregon users without compensating benefit to Washington users. Under Washington decrees, any water secured from Oregon would be used to irrigate 2,000 acres of undeveloped land in Gardena, and this is the true purpose of this suit. Oregon's present practice benefits Washington both economically and in water supply. Equality of right forbids interference with this practice.

Decrees in Washington, to which Oregon and its citizens were not parties, do not bind Oregon or this court and have no probative effect or evidentiary value in this proceeding.

The Gardena priority is limited by the Washington decrees to the natural supply of the stream at its point of diversion in 1892 and does not impinge on Oregon's right, then and now exercised, to divert the entire surface flow of the stream in Oregon during the dry season. If the Gardena appropriators' intention was to appropriate any of the waters flowing in the stream at the Red bridge in Oregon, such appropriation has never been consummated by application of any of said waters to beneficial use, although more than 40 years have elapsed. Lack of diligence in the prosecution of the Gardena development, and a complete change of intention on the part of the appropriators both as to means of conveyance and lands to be irrigated, prevent the application of the doctrine of relation to the Gardena appropriation, and limit the priorities of its

irrigators to the date of actual application of water to the lands.

Washington has failed to meet its burden of proof on the issue as to duty of water. The overwhelming weight of testimony by practical farmers and experts of unquestioned standing, and the test of actual experiment in measure and use of water on the land, show that Oregon's present use of water is economical and beneficial and can not be interfered with except at the cost of irreparable injury.

Oregon's irrigation from wells being confined to the overlying lands of the well owner, and not having been proven unreasonable in any instance, there is no basis in fact or law for any interference therewith.

The doctrines of prescription and estoppel are applicable and prevent granting Washington's prayer for relief.

## I.

## JURISDICTION

### 1) A Controversy Between States

We do not question the jurisdiction of the supreme court of the United States to determine a controversy between states.

The supreme court has said in various cases that the "Complainant State" brings its suit in a "quasi sovereign capacity", as "parens patriae, trustee, guardian, or representative" of that portion of its citizens whose rights are affected: *Kansas v. Colorado*, 206 U. S. 46, 99, 51 L. Ed. 956, 975; *North Dakota v. Minnesota*, 263 U. S. 365, 375, 376, 68 L. Ed. 342, 346.

This language does not mean that the rights in the waters of the stream are essentially different because a state appears as nominal complainant.

This court pointed out in the case of *Wyoming v. Colorado*, 259 U. S. 419, 468, 66 L. Ed. 999, 1015, that:

> "* * * Colorado answers that this is not a suit between private appropriators. This is true, but it does not follow that their situation and what has been accomplished by them for their respective states can be ignored. As respects Wyoming the welfare, prosperity and happiness of the people of the larger part of the Laramie valley, as also a large portion of the taxable resources of two counties, are dependent on the appropriations in that state. Thus the interests of the state are indissolubly linked with the rights of the appropriators. To the extent of the appropriation and use of the water in Colorado a like situation exists there. * * *"

While the same language is not used in the other interstate water cases, a reading of such cases will clearly show that the rights of the state depend upon the rights that its citizens have acquired in the use of water. The state itself has no water right. It appears only for the protection of such rights as its citizens have acquired.

So in this case all the state of Washington accomplishes by appearing as complainant is the protection of the rights of its irrigators. The Washington irrigators acquire no better right and stand in no better position by reason of the fact that the state appears as complainant; nor do irrigators in Oregon suffer loss of their water rights on that account.

## II.

## RULE OF DECISION

### Equality of Right.

*Kansas v. Colorado*, 206 U. S. 46, 51 L. Ed. 956, 27 S. Ct. 655, declared the proposition:

> "One cardinal rule, underlying all of the relations of the states to each other, is that of equality of right."

and made this rule the basis of decision in controversies between states.

The determination of the relative rights of contending states in respect to the use of streams flowing through them does not depend upon the same consideration and is not governed by the same rules of law that are applicable in such states for the solution of similar questions of private right. Mere technical rights are disregarded and the court considers not only "the pertinent laws of the contending states" but also "all other relevant facts": *Wyoming v. Colorado*, 259 U. S. 419, 465, 470; 66 L. Ed. 999, 1013, 1015; 42 S. Ct. 552. *Connecticut v. Massachusetts*, 282 U. S. 660, 670; 75 L. Ed. 602, 607; 51 S. Ct. 286.

In applying the doctrine of equality of right the court looks to the result of the decision and not the formula by which it is obtained: *New Jersey v. New York*, 283 U. S. 336, 342; 75 L. Ed. 1104, 1106; 51 S. Ct. 478.

The application of the doctrine to interstate water cases does not call for "equal division", or "relative use" of the waters of the interstate stream as between two states.

The difficulty lies not in stating the rule, but in applying it.

Washington, by the authorities cited in its brief, recognizes the existence of the rule. The controversy in this case is not over the basic rule of decision but rather over the application of the rule to the facts disclosed.

In *Kansas v. Colorado*, supra, and *Wyoming v. Colorado*, supra, one of the chief considerations of the court in applying the rule was the development which had been accomplished by the use of the water in dispute.

In both cases they considered the injury to this development which would result from an interference with the water supply, and contrasted this injury with the benefit that might be expected to result to the other state from such interference.

In *Kansas v. Colorado* the court considered the benefit which resulted to the lower state by the use of the water in the upper state both by increase of ground water supply through seepage, and by the development through trade and commerce with the irrigated district.

The court also considered that injury to a small portion of Kansas citizens and territory without injury to the state as a whole was not sufficient to call for action.

In both cases the court refused to let a mere technical right interfere with an accomplished development.

In both cases the court recognized that silent acquiescence in a development was a factor to be considered.

In *Wyoming v. Colorado* they concluded that, considering all relevant facts, equality of right would be reached by applying the doctrine of appropriation.

Because the doctrine of appropriation was applied in the Wyoming case, the state of Washington insists that the strict doctrine of appropriation, as applicable between individuals, is the rule which should guide the court in the decision of this case, despite the fact that Washington has made no showing which would bring the instant case within the conditions and circumstances which governed the decision in the Wyoming case.

The Walla Walla valley is one great community located partly in Washington and partly in Oregon. Its commerce, its social life, and its growth and development are indissolubly linked without regard to the state line. Advancement on either side of the state line is beneficial to the other.

Irrigation first began in Washington on the tributaries and has developed intensely with farms now averaging thereon about 17 acres. Development on the main stream came later, and with larger farms. This later development has caused this controversy to arise.

In Oregon irrigation began from the main stream and developed intensely with farms on the Milton fan averaging about seven acres, and in the whole community about 10 acres (Stipulation No. 3; R. 17 and 18).

The stream system is peculiar. The main stream has deposited a gravel fan (called herein the Milton fan) 12 to 20 feet thick at the mouth of the canyon

beginning at Milton, Oregon, and extending north and northwesterly for about four miles.

The Walla Walla river enters upon this fan at Milton, and is thereafter locally called the "Tum-a-lum" in Oregon. In passing over this fan the stream goes dry during the irrigation season and has gone dry every year since 1880.

At the point of entering upon this gravel fan the stream branches off into distributaries. The first is the Little Walla Walla, and further down on the fan the Little Walla Walla branches into the Ford and Crockett branches. These distributaries likewise have gone dry during the irrigation season for a like period of time.

At least since 1880 it has been the custom of farmers in the Milton community to use the Little Walla Walla and its distributaries as a distributing system for irrigating their farms, and for that purpose every year, by means of a dam, they have turned the waters of the main stream into the Little Walla Walla channel.

The gravel fan is coarse and loose in texture; exceedingly permeable, and conducive to a great amount of seepage. The dry stretches in the Tum-a-lum and the Little Walla Walla distributaries are caused partly by the natural seepage and stream loss, and partly by diversion for irrigation.

Along the outer rim of the Milton fan, springs break out. Water from these springs, increasing in its several courses, flows in a northerly direction into Washington, where it is used for irrigation.

In Washington, Mill creek, one of the tributaries of the Walla Walla river, has also deposited a gravel

fan at the mouth of its canyon, extending past the city of Walla Walla, with the same characteristics as the Milton fan in Oregon. Due to the same causes, Mill creek goes dry during the irrigation season at about Gose street in Walla Walla. Likewise, springs break out along the outer rim of the Mill creek fan furnishing water in lower Mill creek and in a number of other spring branches emptying into the Walla Walla river, which water is also used for irrigation.

The Master found that in Oregon from 1880 on, all of the surface flow in the stream during the dry season has been diverted and used in irrigation to the extent that the channel of the main stream for a distance of two miles and the channels of the Little Walla Walla system of distributaries have been rendered entirely dry (Master's Report, pp. 54, 55, 56 and 58). This finding is amply supported by the evidence (see argument, supra, pages 15–19, under the heading "Par. (2), pp. 61 to 64, Complaint's brief"; and pages 23–25, under the heading "Par. (4), pp. 66 and 67, Washington's brief".)

The Master found that this use of water was with the knowledge of many of the irrigators within the state of Washington (Master's Report 55 and 64), and this finding is supported by the evidence to which he refers.

He found (Master's Report 54, 62 and 63) that Washington had permitted this use of the entire surface flow of the stream in Oregon without interruption and without protest.

Stipulation No. 3, paragraphs III, IV, and V (R. 15 to 18), show an intensive and valuable development of the Oregon community.

This development is comparable with that described in *Kansas v. Colorado*, supra, which was one of the controlling factors in determining the "Equality of Right". Mr. Justice Brewer said, on page 109 of 206 U.S.:

> "These tables disclose a very marked development in the population, area of land cultivated, and amount of agricultural products. Whatever has been effective in bringing about this development is certainly entitled to recognition, and should not be wantonly or unnecessarily destroyed or interfered with. That this development is largely owing to irrigation is something of which from a consideration of the testimony there can be no reasonable doubt. It has been a prime factor in securing this result and before, at the instance of a sister state, this effective cause of Colorado's development is destroyed or materially interfered with, it should be clear that such sister state has not merely some technical right, but also a right with a corresponding benefit. * * *"

Since the pleadings admit, and the Master found (Master's Report, p. 110) that irrigation is necessary to agriculture, it is evident that a substantial interference with Oregon's practice would interfere with and destroy the Oregon development.

Stipulation No. 3 (R. 15 to 18) also shows a large development of the territory in Washington.

The Master found (Master's Report 74 and 73) that this development in Washington was without the use during the dry season of any of the waters rising above the Red bridge in Oregon.

He found, however (Master's Report 58 and 74), that water from the zone of springs in Oregon flows

down into Washington during the dry season. Washington's frequent reference in its brief to waters flowing across the state line from Oregon must be construed as referring to this spring water, since there is no evidence in the record that any of the up-river surface flow of the stream in Oregon was ever permitted to flow down to and across the state line during the dry season.

The situation is such that during any part of the year that there is sufficient water to supply all Oregon rights there is more than enough water in the Washington streams and tributaries to supply all Washington rights without drawing on the Oregon stream. (Master's Report, pp. 63 and 64; see also Argument, supra, pages 36–37, under heading: "Par. (10), page 71, Washington's brief".)

It is evident, therefore, that the entire development in Washington was made without the use of any of the surface flow of the stream in Oregon during the dry season.

The question is whether Oregon's irrigation practices—which have continued for 55 years with Washington's acquiescence and approval—shall now be interfered with and Oregon's development destroyed because of Washington's shortage of water due to natural causes and her own actions, and because of Washington's desire to develop an additional 2,000 acres under the Gardena priority.

Under the authority of *Kansas v. Colorado*, supra, it would not be in accord with the doctrine of "Equality of Right" to take from Oregon the water that has been the basis of her development in order to give to Washington that which she has never had or enjoyed and which has worked no part in her irrigation development to date.

Due to a cycle of dry years (Or. Abs. p. 100; Master's Report, p. 9; Complaint, p. 7; Ans. pp. 7 and 8), there has been a decrease in the flow of the stream during the last ten years. Although it is alleged in the complaint and admitted by the answer that this decrease in flow has been caused by a deficiency in rainfall, Washington now argues in its brief that the deficiency is due to an increased diversion and use of water on the Oregon side of the state line. The argument is without basis in the proof (see Argument, supra, pp. 50–54, under headings: "Par. (3), p. 85, Washington Brief", and "Par. (4), pp. 86 and 87, Washington Brief"), and the Master's Findings are to the contrary. No increase of diversions from the main stream in Oregon in recent years could have caused this diminution of flow, because all late rights in Oregon (1903 and later) on the main stream are cut off before there is any shortage or regulation in Washington in each year. (Master's Report, pp. 63, 64; see Argument, supra, pp. 36–37, under the heading "Par. (10), p. 71, Washington Brief"). The shortage to some Washington rights is the result of the enforcement of the Lowden decree, which was rendered prior to 1917 (Wash. Nar. Test. p. 69). The shortage to other Washington rights was caused by the enforcement started in 1929 of the present Washington decree (Wash. Ex. 12), and by artificial changes in natural conditions in Washington. (See Argument, supra, pp. 50–53, under heading: "Par. (3), p. 85, Washington Brief").

### Injury Without Benefit.

In *Kansas v. Colorado*, supra, the court in determining equality of right refused to inflict injury upon one state when there could be no corresponding benefit to the other.

The Master found (Master's Report, p. 113) that to limit the long-established use in Oregon would materially injure Oregon users without a compensating benefit to Washington users. The record further shows that quantities of water—as much as 25 c.f.s.—half of the Gardena right, after July 1, turned over the gates at the Red bridge completely sank into the river bed. There is no convincing evidence that water so sinking is again available for use to Washington appropriators. There is no showing in this case that the diversion of the water at the Red bridge and its application to the irrigation of lands adjacent to the river is more detrimental to the users within the state of Washington than to have the same amount of water turned past the Red bridge to sink into the channel of the Tum-a-lum river between there and the McCoy bridge (Master's Report, p. 72). The Master's Finding is amply supported by the evidence. (See Argument, supra, pp. 19–23 under heading "Par. (3), on pp. 64 to 66, Washington Brief").

Quantities of water amounting to as much as 25 c.f.s. turned over the dam at the Nursery bridge did not reach the McCoy bridge within three or four days. Such a quantity of water applied on the Milton fan, where the average farm area is about seven acres, would irrigate 95 farms and support 95 families. To take this amount of water away from Oregon would ruin 95 Oregon farms and render 95 Oregon families without support and avail Washington nothing. Oregon would suffer an irreparable injury to remove farms already established, without a corresponding or any benefit to Washington.

**Benefit to Washington from Oregon Irrigation.**

In determining equality of right as between Kansas and Colorado, Mr. Justice Brewer, at pages 100 and 101, 206 U. S., said:

"* * * But we are justified in looking at the question not narrowly and solely as to the amount of the flow in the channel of the Arkansas river, inquiring merely whether any portion thereof is appropriated by Colorado, but we may properly consider what, in case a portion of that flow is appropriated by Colorado, are the effects of such appropriation upon Kansas territory. For instance, if there be many thousands of acres in Colorado destitute of vegetation, which, by the taking of water from the Arkansas river, and in no other way, can be made valuable as arable lands producing an abundance of vegetable growth, and this transformation of desert land has the effect, through percolation of water in the soil, or in any other way, of giving to Kansas territory, although not in the Arkansas valley, a benefit from water as great as that which would inure from keeping the flow of the Arkansas in its channel undiminished, then we may rightfully regard the usefulness to Colorado as justifying its action, although the locality of the benefit from the flow of the Arkansas through Kansas has territorially changed." * * *

Stipulation No. 3, paragraph 5 (R. 18), shows the Walla Walla population to be 15,976. The stipulation, paragraph 5 (R. 17), shows the total urban population in the related area in Oregon to be 2,308. The map (Wash.'s Ex. 17) shows the close proximity of the city of Walla Walla to the related lands in Oregon.

The Master found:

"The city of Walla Walla was the largest community to grow out of the productivity of the com-

bined area. The industries were largely centered there, and the profits accruing from the interchange of raw materials for merchandise built up and developed that city." (Master's Report, p. 52.)

It is a matter of such common knowledge and experience as to be the subject of judicial notice that cities benefit from the settlement and development of the surrounding territory, and that the larger cities benefit much more in proportion than the country towns. That this is true is shown by the size of Walla Walla as compared to the total urban population of Oregon in the related territory, and by the number of industries developed in Washington, many of which must necessarily draw custom from the Oregon side. Such benefit can not be exactly measured, but, to that extent, whatever it be, Walla Walla and, through it, the State of Washington, has benefited from the intense cultivation and close settlement of the Oregon irrigated lands.

Because of the permeable nature of the gravel soil upon which the main body of the Oregon irrigated land lies, there is a prompt loss by deep percolation from the amount of water used in irrigation. The water so lost enters the ground water immediately, and this ground water supplies the spring branches which rise at the fringe of the gravel fan.

The Master found (Master's Report, p. 74) that these springs rose and fell with irrigation. He found (Master's Report, p. 111) that these springs were fed from irrigation. Since he found, as heretofore shown in argument, that no portion of the surface flow of the stream in Oregon from above the red bridge was ever used during the dry season for Washington irrigation, it is evident that these springs furnish the dependable summer supply of water from Oregon which

is available for Washington's irrigation. (See Statement, supra, pages 5–7, under heading "(b) Stream System").

The uncontradicted testimony shows (Oregon Abs., Piper, pp. 72, 73, and 74; Harding, p. 125; Roeder, p. 45; Washington's Ex. 16) that the irrigation of land upon the gravel fan in Oregon had the effect of increasing the ground water supply. Certainly, water percolating through the soil is subject to some lag as compared to water flowing in a surface stream. This lag necessarily makes the water available at a later and more critical period than if it had been permitted to flow down a surface stream.

The Master found (Report, pp. 74 and 75) that the Washington court in 1928, in the Ackermann case (Wash. Ex. 11; Referee's Report, p. 4), held that the irrigation in Oregon was a benefit to Washington because the springs were fed by water applied to lands in Oregon, and because it made the water available later in the irrigation season.

A similar situation received notice by this court in the case of *Kansas v. Colorado*, supra, as is indicated in the quotation given above.

The result is that the settlement, cultivation, and irrigation in Oregon are of great benefit to the state of Washington.

This is a matter that must be considered in determining equality of right.

**Purpose of Suit.**

Decisions of this court do not warrant injury to an established development in Oregon in order to extend irrigation in Washington.

The Master's Report finds (p. 60) that the Walla Walla Irrigation Company (Gardena) was awarded a right to irrigate 7,000 acres with priority as of 1892 (Stip. No. 5, R. 24). Stipulation No. 5 (R. 38) shows about 2,000 acres of this land not yet irrigated.

Any water taken from Oregon will, under the permission and provision of the Washington decree (Wash. Ex. 12, Decree, pp. 69 and 72), be used for the development of this additional acreage before any portion is surrendered to junior rights in Washington. (See Washington brief, p. 150, Par. (1).)

This taking of water to extend their irrigation is no different, in the eyes of equity, than if it were a proposed new diversion.

In *Wyoming v. Colorado*, supra, the rule of prior appropriation was applied to prevent a proposed new diversion from injuring established development.

It is not authority for the application of that rule so as to destroy the established development in Oregon in order to extend the area of irrigated land in Washington.

Under the doctrine of "Equality of Right", Washington can not prevail because: (1), the development in Oregon is long established; (2), Washington seeks to take from Oregon irrigators water they have always used, and Washington has never had; (3), to grant Washington's prayer would seriously and permanently injure Oregon, with no corresponding benefit to Washington; (4), the present use in Oregon is of actual benefit to Washington, both in prosperity and water supply; (5), because the purpose of the suit is to take from Oregon water needed to maintain a long estab-

lished development in order to irrigate lands in Washington now undeveloped.

## III.

## Specific Issues Tendered.

1) Priority of Gardena rights.

(1). Effect of state decrees.

The Master found that the decrees entered in one state had no binding effect upon persons who were not parties thereto (Master's Report, p. 50).

It is well established that a water user upon an interstate stream may go into the proper state or federal district court and seek such remedy as may be necessary to define and protect his rights as against a water user in another state without making either state a party, and his rights will be as fully protected as if it were a purely intrastate stream.

*Rickey v. Miller & Lux*, 218 U. S. 258, 54 L. Ed. 1032.
*Bean v. Morris*, 221 U. S. 485, 55 L. Ed. 821.
*Willey v. Decker*, (Wyo.) 73 Pac. 210, 226.
*Taylor v. Hulett*, (Ida.) 97 Pac. 37, 19 L. R. A. (N. S.) 535.
*Cline v. Stock*, (Neb.) 98 N. W. 454, 456.
*Conant v. Deep Creek*, (Utah) 66 Pac. 188.

On the other hand a state in its capacity as *parens patriae* may protect the rights of its citizens as against a neighboring state and its citizens by a suit in the supreme court of the United States (*Kansas v. Colorado*, supra). The state of Washington has chosen the latter course.

When a decree has been entered by this court apportioning the water between the two states, such a decree is final and conclusive upon the citizens of both states. It must necessarily follow that the citizens of each of these states are thereafter precluded from seeking any relief in either a state or federal court which would in any way conflict with the decree of this court. The powers of each state would thereafter be limited to the distribution of the waters apportioned to such state.

Inasmuch as each state has rendered decrees establishing the relative rights of its citizens as between themselves to the use of the waters of the stream, it is necessary to consider the effect of these decrees.

It will be noted that neither the state of Oregon nor its citizens were parties to the adjudication in the state of Washington, and neither the state of Washington nor its citizens were parties to the adjudication in Oregon. The full faith and credit provision of the constitution does not make the decisions in these adjudication cases in any way binding upon the states and individuals not parties to the suit.

The rule is that a judgment is not binding except as between parties and privies.

*Stacey v. Thrasher*, 6 How. 58, 12 L. Ed. 337.
*McLean v. Meek*, 18 How. 18, 15 L. Ed. 227.
*Spokane Etc. R. Co. v. Whitley*, 237 U. S. 487, 59 L. Ed. 1060, L. R. A. 1915F 736.
*Bagley v. Gen. Fire Ex. Co.*, 212 U. S. 477, 53 L. Ed. 605.
*Englehard v. Schroeder*, 278 Fed. 341; affirmed 258 U. S. 610, 66 L. Ed. 789.

See also 34 C. J. 984, section 1405, and note 36, citing cases from the United States supreme court and many cases from the circuit court of appeals.

This rule is in force in Washington (*Nebraska Invest Co. v. Corlett*, 172 Pac. 851; *Savage v. Tacoma*, 112 Pac. 78).

It is also in force in Oregon (*Savage v. McCorkle*, 17 Or. 49, 21 Pac. 444; *Carnes v. Dalton*, 56 Or. 596, 110 Pac. 170).

Neither the state of Washington nor any of its citizens can acquire any right as against the people of the state of Oregon by reason of the fact that a court of that state, in a proceeding to which neither the state of Oregon nor its citizens were parties, entered a decree which would be violative of Oregon rights.

Kinney states the rule as to water adjudications as follows:

> "As no one is bound by the judgment or decree unless they are made parties to the action, so also the rights of a person not a party to the waters of a stream can not be raised by a party to the action upon the ground that the stranger has a superior right to that of his opponent. In other words, the Court must determine the action as between the rights of the persons actually made parties and before it. In a leading case upon this subject it is said (Gutteries v. Albuquerque etc. Co., 188 U. S. 545, 47 L. Ed. 588, 23 Sup. Ct. Rep. 338) 'Neither do we think that the trial Court was called upon, at the instance of the defendants, entire strangers in every aspect to other appropriators, to inquire into and pass upon the question whether appropriators of water below the mouth of the proposed canal of appellee would be injured by the construction of the canal. The rights of such persons will not, of

course, be injuriously affected by the decree in this cause, and non constat but that they may yet intervene for their own protection, if they deem that the construction of the canal will be an invasion of their rights, or that they may be willing to forego objection to the construction of the canal.' " Kinney on Irr. & Water Rights, (2d Ed.) Vol. 3, Sec. 1542, p. 2773.

By reason of the fact that appropriators of water do not own the body of the water in a stream, but are only owners of a usufructuary right to the use thereof, there is a relation existing between the individual water users which must be considered in determining the extent of their rights.

The decree in Washington (Wash. Ex. 12) determined the relative rights of the citizens of the state of Washington. It did not take away any of the rights of the citizens of Oregon, nor attempt to determine the relation between the rights of the citizens of Oregon, and the rights of the citizens of Washington.

The decree in Oregon (Wash. Ex. 1) likewise determined the relative rights to the use of the water by the citizens of Oregon and in no way took away any of the rights of the citizens of Washington, nor attempted to determine any of the relative rights between any of the citizens of Oregon and the citizens of Washington.

It thus appears that the relative rights between the citizens of the state of Oregon and the citizens of the state of Washington have not been determined.

A comparison of Washington's Exhibit 12 with the Oregon decree (Wash. Ex. 1) is interesting. It shows

that on page 6 of the decree in Washington's Exhibit 12 there is a finding:

> "* * * That water rights were initiated on the date of appropriation.",

and that in the long tabulation of rights there is but one date of priority fixed for each tract of land; showing that Washington in each instance fixed the priority of the entire tract as of the date of first appropriation for the irrigation of any of it—and this regardless of the fact that the irrigator may have then only intended to irrigate part of the tract and that many years have passed before he formed any intention or made any effort to irrigate the remainder.

Oregon's decree (Wash.'s Ex. 1), however, shows many dates of priority on a tract. This shows that Oregon's policy was to fix as the priority for each portion of a tract the actual date of the irrigation of that portion.

The rules for determining priorities were entirely different in the two states. The relative priorities between the Washington irrigators and the Oregon irrigators depend upon the facts and are not to be determined by a comparison of decrees rendered under different rules of law, but must be determined by the application of one rule of law to the existing facts.

> "Neither state can legislate for or impose its own policy upon the other." Kansas v. Colorado, 206 U. S. 46–95.

The Washington decree can not be binding on Oregon, nor can it be held to have determined the relative priorities of the Washington irrigators as against the Oregon water users.

The cases cited by counsel do not extend the binding force of state decrees beyond the parties and their privies.

The Acts of Congress of July 6, 1866, and of July 9, 1870, do not and were not intended to make decrees adjudicating water rights binding upon a state and its citizens who were not parties to the proceedings.

## Doctrine of Relation Is Not Applicable to Gardena Appropriation.

Stipulation No. 5 (R. 23 to 45) covers somewhat the history of the Gardena project and water right.

The Master reviews the history in his report, pages 59 to 67.

Beginning with 1891 a succession of notices of intention to appropriate water were filed by different individuals, describing different streams as the source of supply and variously designating the proposed places of use. They appear in the record, pages 40 to 43, as Exhibits "B" to "E", inclusive, of Stipulation No. 5. They may be summarized:

| Exhibit No. | Date | Name of Stream | Name of Appropriator |
|---|---|---|---|
| D | Jul. 24, 1891 | Walla Walla river | Kirk, Boyer & Courtnay |
| B | Feb. 24, 1892 | Walla Walla river | Boyer, Kirk & Courtnay |
| E | Feb. 24, 1892 | Little Walla Walla river | Boyer, Kirk & Courtnay |
| C | Jul. 12, 1892 | Walla Walla river | Walla Walla Irr. Company |

Exhibit "D" describes the land to be irrigated as: "All the land contributory to said ditch or canal capable to being irrigated," and describes the course of the canal as extending from "the place where this notice is posted," "in a general N. W.'ly direction

passing near the mouth of the Touchet river, to a point on the Columbia river near the mouth of Snake river".

Exhibits "B" and "E" describe the place of use as "In Township Seven North of Ranges 33, 34 and 35, East of the Willamette Meridian, and in Township Six North, Ranges 33, 34, and 35, East of the Willamette Meridian."

Exhibit "C" described the place of use as lands "in the state of Washington also in the state of Oregon".

The statute governing appropriation of waters in force in the state of Washington in 1891 and 1892 is quoted in full by the Master in his report at pages 67 and 68.

Section (2), clause (2), requires the notice to state "the place or places, as near as may be, of intended use".

It is evident that none of these notices comply with this requirement.

Section (3) of the act as quoted requires that construction must be started within six months, and says:

> "* * * it being herein expressly provided that such works must be diligently and continuously prosecuted to completion, unless temporarily interrupted by the elements.
>
> "'(4) Vested Right—Forfeiture by NonCompliance. 'By a strict compliance with the above rules, the appropriator's right to the use of the water actually stored or diverted relates back to the time the notice was posted; but a failure to comply therewith deprives the appropriator of the right to the use of the water as against a subsequent appropriator who faithfully complies with the same.'"

Washington, in effect, concedes that there was no such diligence in completing this project and applying waters to beneficial use as to comply with the requirements of this statute and relate the right back to the date of the posting of notice, but contends that the company could have made an appropriation other than under the statute, in which event the statutory requirement of diligence would not be required, but only such diligence as was required by custom and usage, and that in such case the date of priority related to the beginning of construction.

In this case notice was posted and construction started in 1892, so it is of no importance to argue as to which of these events the right related.

Oregon's contention is that the Washington statute merely declared the rule governing diligence as established by custom and usage.

The rule with respect to the Doctrine of Relation is stated in Kinney on Irrigation and Water Rights (2d Ed.), pages 1297 to 1299, as follows:

> "* * * But the rule works both ways. There must not only be priority but there must be also reasonable diligence. If, therefore, there was unreasonable delay upon the part of the one who took the first step, in any of the proceedings necessary for the consummation of the right, and the rights of subsequent appropriators have ben properly instituted and the same have been followed up by a strict compliance with the law and with all due diligence, then, in that case, the rights of the parties are reversed. The right of relating back does not apply to the one who took the first step, and his right only begins with the actual consummation of his appropriation. Upon the other hand, the rights of those who started their first steps to make

the appropriation after the first party started and before the actual consummation of his right, become prior appropriators as against the rights of the first party, and take their places in the order of priority as between themselves. The one who started first then takes what water he may, subject to the rights of those who instituted their rights prior to the actual diversion and use by himself, and the doctrine of relation does not apply to his right, but it does to the rights of others.

"The beneficial effect of the rule of the doctrine of relation may thus be readily seen. It does not permit the water to remain under the claim of any person unless he applies it to some beneficial use or purpose within what the law deems a reasonable time, which as we have seen, depends upon the circumstances of each particular case. The title to the water does not vest in the appropriator at the time of his giving notice, but in order to acquire title, and to acquire the right of the application of the doctrine of relation, he must comply with all of the conditions subsequent required by the law. Therefore, upon the consummation of his appropriation and from that time only will the doctrine of relation apply, and then only when that consummation has been accomplished within a reasonable time.

"§ 751. Effect of Doctrine upon Appropriators who do not Comply with the Statute.—Where one attempting an appropriation of water fails to comply with the requirements of the statute, as, for example, in the matter of notice in those states requiring it, a valid appropriation may be made, but the effect is to preclude the appropriator from claiming, by the doctrine of relation, to the time when the first step was taken by him as against one who does comply with all the statutory provisions, and has prosecuted his works to completion in accordance therewith. The rule in a case of this kind is that the right of one who has not complied with

all of the statutory provisions dates only from the last act perfecting such an appropriation which is, in the majority of states, held to be the actual application of the water to some beneficial use."

This rule is quoted with approval in *State ex rel. Ham, etc. v. Supreme Court*, 126 Pac. 945 (Wash.).

It is also stated in effect by the supreme court of Washington in the case of *Still v. Palouse Irrigation & Power Co.*, supra.

The rule is recognized and enforced by the supreme court of Oregon: *Re Rights to Waters of Silvies River*, 115 Or. 27–61 (237 Pac. 322), and *Re Water Rights of Hood River*, 114 Or. 112–131 (227 Pac. 1065).

**There Was no Such Diligence in This Case as to Call for the Application of the Doctrine of Relation.**

Stipulation No. 5, page 3 (R. 25), discloses:

"* * * Mr. Burlingame performed the construction work for the company, using his own equipment and teams up to the time of the formation of the irrigation district, which succeeded to the rights of the company in 1928."

On page 4 (R. 25):

"* * * For the first three miles of the course of the canal from the river the soil conditions presented no serious difficulties in construction."

Continuing on pages 7 and 8 (R. 28):

"Water was first diverted from the river into the canal in the year 1893 for puddling purposes and turned out through the spillway into the West Little Walla Walla river. In the year 1898 water was first used for irrigati n when 68 acres along the line of the canal were irrigated. In 1899, 20 addi-

tional acres were irrigated, but these latter mentioned lands have since been abandoned. In 1901, 280 acres were irrigated in Oregon from the canal running from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 N. R. 34 E. W. M. into Oregon, and between 1901 and 1918, 72 additional acres in Oregon were irrigated from the canal, but the irrigation of these lands was discontinued in 1919, when the company abandoned the operation of this canal. These lands are now irrigated from the Milton-Freewater and Hudson Bay ditch. In 1898, 68 acres were watered from the canal; in 1899, 20 acres additional were watered in Washington, which were later abandoned.

"In 1904, 193 acres were watered from the canal in Washington, including the 20 acres above mentioned as later abandoned."

E. C. Burlingame was the man in charge of the construction of the Gardena canal (Or. Abs. pp. 18 and 19).

His testimony shows that from the fall of 1893 to the fall of 1895 or spring of 1896 no construction work was done. From 1892 to 1896 (four years) but two and a half miles of ditch had been built.

In the spring of 1896 work upon the canal again ceased until the fall and winter of 1897. From the spring of 1898 to the summer of 1899 no work was done upon the canal. In 1901 no work whatsoever was done on the canal, and no work was done in 1902 until the month of August.

It is apparent from the testimony that there was no work upon this canal excepting in the fall, winter and spring when Burlingame was not working elsewhere. During the greater part of each year no work whatsoever was done upon the canal, and there were

at least six years of time in which no construction work was done.

The diary of the work done upon the ditch reads about as follows:

In August, 1892, one man and a team plowing and scraping.

Later in 1892 to the fall of 1893 (probably one year) construction work carried on.

Fall of 1893 one man left in charge, and no construction work whatsoever done for two years.

Fall of 1895 three or four men with teams worked to the spring of 1896.

Spring of 1896 Burlingame went to Montana, leaving one man in charge until the fall of 1897. (More than a year without work.)

Spring of 1898 Burlingame went to Wallace, Idaho, and was gone until the summer of 1899, and no work was done. (More than a year without work.)

Summer of 1899 and the spring of 1900 Burlingame worked an outfit on the ditch and on the Locher place and did his first irrigation.

Spring of 1900 Burlingame went to Hamilton, Washington, and no work was done.

In 1901 no work was done.

In 1902 until August no work was done.

In August, 1902, three fresnos and a foreman were put on to work until February, 1903, when Burlingame returned and took charge.

More than one-half of the time no work whatsoever was done.

The Master's findings (Report, p. 62) that the development of the project was "slow and intermittent" is warranted by the facts.

It can not be said that diligence, within the meaning of the law, was displayed. There was no diligence in leaving the work for two years from the fall of 1893 to the fall of 1895 with nothing done. There was no diligence in leaving the canal from the spring of 1896 to the fall of 1897 with no work done. There was no diligence in leaving the work from the spring of 1898 to the summer of 1899 with no work done. There was no diligence in leaving the canal from the spring of 1900 to August, 1902, with no work done.

The quoted portions of Sitpulation No. 5 show that in the first 10 years there were but 368 acres irrigated, and none prior to 1898. Page 9, of Stipulation No. 5, shows that contracts for only 368 acres were sold. Of this amount 300 acres were later abandoned. By 1904 contracts for 473 acres had been sold (300 of which were later abandoned).

A reference to pages 11 and 12 of Stipulation No. 3 shows a steady progress of irrigation in Oregon, and that in 1903 there were a total of 6,385.53 acres actually irrigated in Oregon from the Walla Walla river. This shows a steady and progressive development and appropriation in Oregon, and shows that, before there was any irrigation which amounted to anything from the Gardena canal, there was land developed in Oregon, homes established, and improvements made.

A reference to Washington's Exhibit 18, page 120, shows the earliest records of the Hudson Bay canal indicate that there was actual development of their 1903 water right, since their canal carried as high as 60 second-feet in February, 1906; 63.5 second-feet in March, 1906; and 63.5 second-feet in April of that year. A reference to the same exhibit (page 13), shows that

as late as 1917 was the first record of actual use of water in the Gardena canal.

We respectfully submit that the work done upon the Gardena canal was not such as to entitle them to invoke the doctrine of relation, and their priorities should run from the date of actual application of water to each tract, or, at the earliest, from the time in 1904 when they changed their intention as to the method of the construction of their ditch, and as to the land which should be irrigated under it, and then, for the first time, displayed diligence.

The restrictions we urge upon the application of the doctrine of relation have been recognized and applied by the United States supreme court:

> "It no doubt is true that the original promoters intended all along to make a large appropriation from the Laramie by some means, provided the requisite capital could be obtained, but this is an altogether inadequate basis for applying the doctrine of relation.
>
> "No separate appropriation was effected by what was done on the Upper Rawah ditch. The purpose to use it in connection with the Skyline was not carried out, but abandoned. This, as Link testified, was its 'principal' purpose. The purpose to make it an accessory of the large project was secondary and contingent. Therefore the work on it can not be taken as affecting or tolling back the priority of that project.
>
> "Actual work in making the tunnel diversion was begun as before shown, about the last of October, 1909. Thereafter it was prosecuted with much diligence and in 1911, when this suit was brought, it had been carried so nearly to a state of completion that the assumption reasonably may be indulged that, but for the suit, the appropriation soon would have

been perfected. We conclude that the appropriation should be accorded a priority by relation as of the latter part of October, 1909, when the work was begun.

"Applying a like rule to the Wyoming appropriations, several of them must be treated as relating to later dates, and therefore as being junior to that appropriation. Some of the projects in that state are founded on a plurality of appropriations, a part of which are senior and a part junior to that one. * * *" Wyoming v. Colorado, 259 U. S., 419–494 and 495.

Here is a controversy between states where diligence was inquired into and priorities fixed.

A similar inquiry here demonstrates that the Gardena priority is not earlier than 1904 for any land except the 68 acres of the Locher place.

The testimony of Burlingame shows (Or. Abs., p. 20) that he started to build the lateral running northwesterly (which is now the main canal) in 1904, and in the winter of 1903-1904 they decided to build the syphon. At that time they had constructed into Oregon from 15 to 18 miles to about the center of Section 19-6-34 (Or. Abs., p. 21). The canal was built to the Locher place in 1898 or 1899 (Or. Abs., p. 18). From this it appears that the Oregon lateral was built some time between 1898 and the winter of 1903 and 1904. The Oregon lateral (originally the main canal) was abandoned in 1919 (Or. Abs., p. 15; Stipulation No. 5). Having abandoned all the work performed between 1898 and 1904, such work "can not be taken as affecting or tolling back the priority" of the Gardena project, as is shown by the quoted language in the case of *Wyoming v. Colorado*, supra.

This state of facts clearly shows a lack of "strict compliance" with the provisions of section (3) of the Washington law of 1891 (Rem.-Bal., § 6318), which provides:

> "It being herein expressly provided that such works must be diligently and continuously prosecuted to completion unless temporarily interrupted by the elements * * *."

and bring it within section 4 of the act which provides:

> "But a failure to comply therewith deprives the appropriator of the right to the use of the water as against a subsequent appropriator who faithfully complies with the same." (Rem.-Bal., § 6319.)

and entirely deprives Gardena of the right to assert an 1892 priority.

It must be noted that the testimony does not disclose that the work was at any time "interrupted by the elements". Since this is the only provision for interruption of the work under the Washington statute, through which they claim their priority, the maxim "*expressio unius est exclusio alterius*" applies and no other excuse can be presented for the delay in the work.

Burlingame testified that owing to financial troubles he had to go slow in construction, and there was nothing else that caused the delay (Or. Abs., p. 21).

> "The mere lack of means with which to prosecute the work is not a sufficient excuse for delay. As was said in an early Nevada case: 'It would be a most dangerous doctrine to hold that ill health or pecuniary inability of a claimant of a water privilege will dispense with the necessity of actual appro-

priation within a reasonable time, or the diligence which is usually required in the prosecution of the work necessary for the purpose. We find no recognition of such doctrine in law. Nor are we disposed to adopt it as a rule to govern cases of this kind.' Again, as we said in an Oregon case: 'The authorities clearly show that the claimant's pecuniary condition is not an excuse; and, though the doctrine may seem harsh, it is nevertheless right.' The authorities all agree upon this proposition and there is no conflict upon this point. * * *" Kinney on Irr. and Water Rights, (2d Ed.) Vol. 2, § 739, p. 1276.

Since the company did not comply with the statute under which they were attempting to operate, and did not comply with the general rules respecting diligence in effecting the appropriation, it would clearly not be equitable or in accordance with the rule of "equality of right" to apply the doctrine of relation, as against the Oregon irrigators who, during all of the time, appropriated and used the waters, and by the use developed their community and their homes. To do so would return to a state of nature large acreages of land in the state of Oregon now intensly cultivated and dotted with homes, and would take a large amount of taxable property from the assessment rolls of the state. It would cause irreparable injury with no corresponding benefit to the state of Washington.

Under the circumstances, the lands in the Gardena project can have no earlier date of priority than of the date of the actual application of water to the land, which could not in any event be in advance of the dates of the water contracts as tabulated in Sitpulation No. 5.

Fixing the priorities as of the date of the sale of the contracts for the land would deprive no Washington

user of anything he ever had, and we believe is as close as the court could come to "equality of right".

The record demonstrates, and the Master found (R. p. 114) that none of the waters of the Walla Walla river rising above the Red bridge have ever been put to beneficial use during the irrigation season under the Gardena filing.

The authorities cited by the Master (R. pp. 69 to 72) and the quotation above from Kinney make it clear that the Doctrine of Relation is never called into application until an appropriation is consummated by the application of the water sought to be appropriated to a beneficial use.

If it were held that the Gardena project intended the appropriation of water from above the Red bridge in Oregon during the dry season, this intention has not been carried out by an application of that water to beneficial use, and therefore, as against the Oregon irrigators using water from above the Red bridge in Oregon during the dry season, the Doctrine of Relation can not apply in favor of the Gardena appropriation, and can not serve to now deprive the Oregon irrigators of water by relating the Gardena appropriation back to either the date of filing of notice or that of beginning of construction.

### Change of Intention

Where there is a change of intention, and water in place of being used upon the lands and through the ditch system originally contemplated, and for which the appropriation was made, is used upon other and additional lands, the rule is that the land irrigated under the subsequent intent and through a different system of ditches is under a new appropriation, and, in case

no new notice is posted, takes a date of priority as of the actual application of the water to the land.

*Williams v. Altnow*, 51 Or. 275–303, (95 P. 200).
*Whited v. Cavin*, 55 Or. 98–100, (105 P. 396).
*Seward v. Pacific Livestock Co.*, 49 Or. 157–161, (88 P. 963).
*In Re Waters of Umatilla River*, 88 Or. 376–395, (168 P. 922).
*Boyce v. Cupper*, 37 Or. 256–259, (61 P. 642).
*Porter v. Pettingill*, 57 Or. 247–250 and 251, (110 P. 393).
*Ison v. Sturgill*, 57 Or. 109–116–117, (109 P. 579).
*Nevada Ditch Co. v. Bennett*, 30 Or. 59–100, (45 P. 472).
*Andrews v. Donnelly*, 59 Or. 138–146 and 148, (116 P. 569).
*Simpson v. Bankofier*, 141 Or. 426–432, (16 P. (2d) 632).

The rule is recognized in Washington: *In re Crab Creek and Moses Lake*, 235 Pac. 37–42.

Oregon's Exhibit 33 was identified by Mr. Burlingame as a tracing of the original survey showing the intention of the parties at the time the Gardena project was begun. The exhibit shows that after the original drawing was made somebody added with pen and ink on the tracing some dots. Mr. Burlingame testified, and his testimony is uncontradicted, that the map as originally drawn (before the alteration) was the cor-

rect representation of the then plan of the Walla Walla Irrigation Company.

He identified Oregon's Exhibit 34 as a blue print of the original survey. His attention was directed to the ditch line marked "lateral" on this map. He stated that this was now the main canal, and that the line marked "main canal" upon the blue print indicated the route of the proposed main canal up until 1903. This exhibit had not been altered.

His attention was then called to Oregon's Exhibit 35, an old and dilapidated blue print, and to the words "Walla Walla Irrigation Company main canal", and the line drawn through the word "lateral", and the line in white ink from the line in section 5 and 6 through the present syphon, and on to the hill in Gardena. He testified that those were put on after the blue print was made. He referred to the word "south", written in white ink, and the line drawn through the word "main", and testified that they were alterations, and that without the alterations and as originally made the blue print delineated the original plan of the Walla Walla Irrigation Company's canal (Or. Abs., pp. 19, 20).

He testified that he made the change to the present plan of construction in 1903, when he discovered that the best land in Gardena could not be irrigated under the ditch as originally planned. He testified that they started to build the Gardena lateral in 1904; that at that time they had already constructed from 15 to 18 miles of canal into Oregon, under the original plan, to about the center of Section 19, Tp. 6 N., R. 34; had run water across Pine creek and actually irrigated land a mile east of that point, and that the Oregon canal, originally the main canal, was abandoned about

1918 or 1919. He testified that the survey of the original canal was carried out and stakes set through Gardena. The syphon was constructed in 1905.

Taking the Exhibits, Oregon 33, 34, and 35 as a basis, Oregon had a survey of the original canal made to ascertain what part of the Gardena lands could have been irrigated from that. The survey was made by W. E. O. Criger, a qualified engineer (Or. Abs., p. 51), who had followed the business for 33 years. He testified that he followed the line outlined on Exhibits 34 and 35 and found the old survey stakes along the whole length of the canal, and prepared a map; that upon the map the hatch marks show the land now irrigated through the Gardena canal which could not have been irrigated under the old ditch, as originally planned.

The conduct of the company in the construction of their ditch bears out the story of Mr. Burlingame (which is uncontradicted) and the exhibits introduced in evidence.

Stipulation No. 5, pages 7 and 8, shows that land was originally irrigated in Oregon in accordance with their old plan in 1901, and shows that the company abandoned the operation of that canal in 1919.

A check of the acreages shown upon Oregon's Exhibit 37 in hatch marks shows that there is now being irrigated through the Gardena canal a total of 1,676.70 acres which could not have been irrigated through the canal under the original plan. Although the testimony of Burlingame shows that the new intention and change of plan of construction was originated in 1903 or 1904, the company did not abandon their original intention until 1919, according to the stipulation, and Mr. Burlingame's testimony. Therefore, they were not simply

changing the place of use but conceived at that time an enlargement of their enterprise.

They filed no new appropriation, and no part of this land could have been irrigated before 1905. Under the authorities we have above cited, this constituted a new appropriation for the additional land, and in no event could the priority of this land be any earlier than the actual application of water, which could not have been earlier than 1905.

Since the benefit of the original appropriation had long been lost by lack of diligence, and since the company made no new appropriation at the time of the change of intention, their priority for that land, which could not have been irrigated under the original plan, must be in each instance the date of actual application of water to the lands, and in no event earlier than 1905.

### Limits of Gardena Appropriation

The rights of Gardena are measured by the beneficial use to which the water has been applied. The decrees in both Washington and Oregon have not attempted to fix an irrigation season for any irrigator. The time of use is left entirely to the demands of the user limited by the supply of water during the season of such demand. In the early part of the cropping period, nature supplies a flood run-off and each water user is permitted to take, without regulation, all of the water he desires (Wash. Nar. Test., Barney, p. 36; Or. Abs., Mason, p. 52, 56, 57, 58). As soon as the flood water subsides to or below the amount required to supply all rights, the water masters in both states begin to measure and regulate the stream. After the

water masters start measuring the water to the irrigators in Oregon, no water goes down the stream past the gravel fan, or through the Ford or Crockett branches to supply lower rights (Or. Abs., Mason, p. 58).

In Oregon, a water master has distributed the water of the Walla Walla river since 1913 (Or. Abs., Roeder, p. 41). Prior to that time the farmers helped themselves (Or. Abs., Forsythe, p. 27).

This distribution in Oregon was carried on without regard to the water users in the state of Washington, and water from the main Walla Walla river was only permitted to go down the main stream, Ford or Crockett branches at flood times, or at the season of the year when water was not used.

The condition of a dry stretch in the stream bed during the irrigation season, following the subsidence of the flood run-off, has existed since prior to the time of any material development in the state of Washington from the Walla Walla river. This condition was accepted as a general condition by the citizens of both Oregon and Washington. The Walla Walla Irrigation Company made the Gardena appropriation under these conditions. When in later years (1905) the company first began to look for wells as another source of supply, Mr. Burlingame realized that the water supply was short for his project. He went up the stream looking for hostile diverters (Or. Abs., Burlingame, p. 21) and he found none. He found the Tum-a-lum was dry between the Nursery bridge and the McCoy bridge. The Hudson Bay ditch, with a priority of 1903, was then in operation. As the manager and part owner of the Walla Walla Irrigation Company, he accepted the

condition then existing as a proper one. He needed water, looked for it, and permitted rights at least as late as 1903 to continue to take water, develop the community, and make use of such water as if they had a perfect right to do so.

These acts on the part of the Walla Walla Irrigation Company and its officers and agents disclose the intention of the parties in making their appropriation. These acts were long prior to this controversy, and are therefore entitled to great weight in determining the extent of the Gardena appropriation.

An appropriation may be limited by time as well as by amount.

In *Cache La Poudre v. Water Supply Co.*, 25 Colo. 161, 53 P. 331, 46 L. R. A. 175, 71 A. S. R. 131, the court says:

> "It seems, both upon principle and authority, that one may make a prior appropriation of a certain quantity of water to be enjoyed for a designated period of time, and another person an appropriation of a like quantity from the same source during another period, and, as to the same he is a prior appropriator himself. In other words there is no difference in principle between an appropriation measured by quantity and an appropriation measured by time."

This principle is enunciated by Kinney, Vol. 2 (2d Ed.), p. 1369 et seq.:

> "Where an appropriation has been made for the use of water for a particular time each year, the use of the appropriator will be limited to that time as against others asserting intervening rights."

It is the rule in Oregon.

*McPhee v. Kelsey*, 49 Or. 193, 201, 74 P. 401, 75 P. 713.
*Gardner v. Wright*, 49 Or. 609, 91 P. 286.
*Davis v. Chamberlain*, 51 Or. 304, 314, 98 P. 154.

The determining factors concerning the time of use include not only the general use that might be made of the water through their works and for the irrigation of their farms but also the intent of the use and the extent of the accustomed use.

The Master found (Master's Report p. 73) that in this case the Walla Walla river above the Red bridge contributed nothing to the main stream of the Walla Walla river after the stream has so receded that the flow of the river at the Red bridge is required for Oregon irrigators, and this condition has persisted since 1880. Furthermore (Master's Report p. 74), from 1892 to date those claiming the right to irrigate the Gardena tract have not applied any of the waters of the Walla Walla river arising above the Red bridge, during the low water period, to the irrigation of their lands. To this state of facts the Master (Master's Report p. 73) applied the principal set forth in the case of *U. S. v. Haga*, 276 Fed. 41, 43, where Judge Dietrich said:

> "(1) While, as already stated, the creek is constructively a tributary of the river, there is no showing that naturally, during the irrigation season, it actually makes any contribution to the river flow. There is a continuous channel, it is true, and there are doubtless short periods of unusual runoff in extraordinary seasons when there is a dis-

charge into the river; but the showing is insufficient to warrant a holding that the older diversions from the river have any substantial beneficial interest in the creek. An appropriator from a main channel can complain of a diversion from a 'tributary' only if and when such tributary would, if not interfered with, make a valuable contribution to the main stream.

"(2) In the second place, there is no warrant for finding that in normal seasons there is any natural flow in the creek later than June 1st, whereas up to about July 1st, and sometimes to a later date, there is an abundance of water in Boise river proper for the supplying of all rights therein, and hence the use of the creek by the defendant infringes no appropriator's right. It follows that plaintiff is not in any way injured by the defendant's diversion of the natural flow of the stream."

The reasons for this rule are clearly set out by Judge Hawley, in *Union Mill & Mining Co. v. Dangberg*, 81 Fed. 73, 118–119, as follows:

"* * * The quantity of water flowing in the Carson river is dependent, not only on the amount of snow which falls upon the mountains and in the canyons from which the river draws its supply, but also upon the time of the year when it falls, and further upon the amount of rain that comes in the spring or summer season of the year. The truth is that in some years, in every month thereof, there is more than water enough to meet and supply all the demands of the farmers and of the mill owners, and that in seasons of extra drought, for a few months in such years, there is scarcely enough for either. The real controversy between the respective parties is confined to a period of time ranging from July 1st to November 1st of each year, during which there is always liable to be an insufficient quantity of water flowing in

the river to enable the parties to make a reasonable use thereof both for irrigating and for milling purposes at the same time. The difficulty in arriving at a proper decree is apparent. The power of regulating or controlling the amount of rain or snow is beyond the jurisdiction of courts. No decree can be framed, which is based either upon riparian rights or of appropriation, or of both, which overlooks the uncertainty of the season, or the necessities of the various litigants, so as to meet the demands of justice and of right. It would be unjust and inequitable to compel the farmers in the valley to allow the water to run down to the mills when the quantity of water was wholly insufficient, to enable the complainant to run its mills with water power. There must be a beneficial use before any protection can be invoked. No provisions should be contained in the decree which would result in depriving one party of the use of the water when the other party could make no beneficial use of it. This would amount to a destruction, instead of a protection, of the rights of the parties." * * *

In the case of *Raymond v. Wimsette*, 31 Pac. 537, 540, the supreme court of Montana states:

"* * * Would it not, therefore, be unreasonable, and contrary to the theory of the law governing the subject under consideration, to hold that although experience of many years, and actual demonstration, confirm the proposition that none of the water in controversy could, if left in the stream, reach plaintiff's place of diversion, at a distant point below, still defendant should be restrained from the use thereof on the ground of plaintiff's prior claim to the water of said stream, at the place of his diversion? In our judgment, such holding would be entirely contrary to the spirit, if not to the letter, of the law; and there is not, even in the letter of the law, anything tending to such a doctrine.

But these observations should not be misconstrued or misapplied, so as to allow wrongful diversion or diminution of the waters of a stream, on the pretense that the water so diverted would be lost, unless it can be shown that by a long course of experience, and not as the occasional result of some unusually dry season, none of the waters in controversy would, if allowed to remain in the stream, reach the prior appropriator's point of diversion."

See also *Beaverhead Canal Co. v. Dillon E. L. & P. Co.*, 85 Pac. 880, 882.

In the case of *Hardy v. Beaver County Irr. Co.*, 65 Utah 28, 234 P. 524 at 529, the supreme court of Utah said:

"* * * What the trial court was called upon to decide was not what would be the equivalent of a full seasonal appropriation by the respondents if there were water available for their use during the entire summer season, since the record shows conclusively that they did not use any water after subsidence of the flood flow in June, but the extent of the appropriation which they had actually made by diversion and beneficial use of the water.

"4. It is elementary that an appropriation of water is limited by time as well as by amount; in other words, that an appropriator's right is limited by the quantity of water which he has beneficially used and the seasonal period during which he has used the same. Santa Paula v. Peralta, 113 Cal. 38, 45 P. 168; Cache Le Poudre v. Water Supply Co., 25 Colo. 161, 53 P. 333, 46 L. R. A. 175, 71 Am. St. Rep. 131; Ft. Lyon Co. v. Chew, 33 Colo. 392, 81 P. 39; Gardner v. Wright, 49 Or. 609, 91 P. 294. And in the case at bar the respondents' appropriations must be limited to the amount of water they can use beneficially during the period of the year when they have actually been accustomed to use the same.

"To the extent that the respondents were accustomed to irrigate their land within the limits of beneficial use during the period between the opening of the irrigation season, viz: the time when their crops are usually planted, or begin to germinate, and the end of the flood or highwater season in the spring, the respondent's rights are prior and paramount to those of appellant under its later appropriations; but as to the water flowing in the river during the remainder of the year, the rights of appellant are prior and superior to those of the respondents."

In the case at bar, since the record shows conclusively that the Gardena project did not use a full head of water after the subsidence of the flood flow in June, the court is not called upon to decide as against the state of Oregon what would be the equivalent of a full seasonal appropriation by that project, but the extent of the appropriation which Gardena had actually made by diversion and beneficial use of the water flowing from Oregon.

An examination of Washington's very scant records (Wash. Ex. 18, pp. 11 et seq.) on diversion of water by the Gardena canal indicates that in 1917 the diversion of water was 76 c.f.s. until the first day of July. Thereafter the amount of water diverted became gradually less to a minimum of about 15 c.f.s. In 1918 the dimunition of the water supply began about the 1st of June, in 1919 about the middle of June, in 1922 about the middle of June, in 1926 about the middle of May, in 1927 about the middle of June, in 1928 before the 9th of June, in 1929 before the 18th of June, in 1930 about the middle of June, in 1931 the last of May, in 1932 the last of June, and in 1933 just following the 4th of July.

An examination of the hydrographs of the Walla Walla river (Or. Ex. 41), and of the measurements (for the years in which we have measurements) of the Gardena canal (Wash. Ex. 18, pp. 37 et seq.), will show that the diminution of the flow of water in the Gardena canal has closely followed the passing of the flood stage of the Walla Walla river. The testimony is absolute and uncontradicted that during all these years the Walla Walla river, and the Crockett and Ford branches in Oregon, have had a dry stretch in their course beginning as early as April in some years, and at least by the 1st of July in all years.

The various spring branches rising below the gravel fan in Oregon and the springs rising in the main Walla Walla river furnish the only water received by Gardena after the channels of the Tum-a-lum, or the main Walla Walla river in Oregon, and the Ford and Crockett branches were turned dry.

The extent that water users on the Gardena tract were accustomed to irrigate their lands was governed by this water supply so used.

Lee H. Smith, a farmer on the Gardena project, after testifying that they had continual water service during the summer months further testified (Wash. Nar. Test., p. 59):

> "In the summer months of 1919 I had enough water in the summer months of June, July and August to get by with my perishable stuff. You see there usually wouldn't be over 200 or 300 acres, and by rotating you can get on smaller amounts. We irrigated our alfalfa in July in 1919. We usually have had water some in July for alfalfa; we wouldn't have any full head or big head, or anything like that, but we had water. * * *"

It will be noted that at this time Gardena was securing sewage water from the city of Walla Walla, which Burlingame said amounted to a maximum of 6½ c.f.s. (Or. Abs., Burlingame, p. 22). This amount of water on the basis of the Washington decree of water would have irrigated more than 700 acres of land. This amount would have more than taken care of their perishable crops of some 200 or 300 acres.

Again Smith says, on the same page:

> "I had plenty of water in 1922. I don't remember if we irrigated the alfalfa, but I know I had 20 acres of potatoes and I got water in August for those. I can't remember whether I irrigated my alfalfa in July of that year. The potatoes and corn and perishables would naturally have the preference in the distribution of water; I suppose they gave them the preference, I don't remember. There was no regulation; it was just the consent of the users."

From this it appears that the irrigators in Gardena adapted their crops and methods of farming to the water received, and in accordance with the limitation of their water supply.

After the abandonment of the sewage water in 1924, Gardena did not get water to irrigate the potatoes and perishables in July. Again Smith testified:

> "In 1927 I discontinued the late potatoes; I did not get to irrigate them in July. In 1930 I did not irrigate my potatoes in July."

The discontinuance of irrigation of their perishables in July by the irrigators in 1927 was after the sewage water had been abandoned, and prior to the time that the water master in Washington took charge of the stream and began to turn down water from the upper stream and tributaries in Washington, thereby

compelling the upper users to change their crops and methods of farming in order to adapt them to a shorter water supply. The Walla Walla Irrigation Company, as the appropriator and supplier of water during the time they were using the sewage water, had a special clause put into their water contracts as follows:

> "It is understood that sewage water from the City of Walla Walla is a part of said water supply."

The Irrigation Company, and the water users entering into contracts with it, thereby acknowledged that water supply from the Walla Walla river was not sufficient. They all knew that it was a flood water right.

In 1917, Hartvedt was sent to take charge of the Walla Walla Irrigation Company's irrigation system by the Public Service Commission of the state of Washington (Wash. Nar. Test., Hartvedt, p. 69).

It was understood that the lands that had been issued water contracts up to that time should have the preference in water (Wash. Nar. Test., p. 20). This land was called "Class A" land and amounted to 2,245 acres. All the balance of the land was considered as "Class B" land and, in the distribution of water as the water supply got short, were the first to be cut off. The class "B" land, therefore, was purely a flood water right, and was so recognized in their class "A" and class "B" contracts. Not only the irrigation company and the irrigators on the project but also the Public Service Commission of the state of Washington recognized that the water supply of their project was limited to a flood and excess water right.

These circumstances bring the Gardena appropriation squarely within the principles above mentioned in the case of *Hardy v. Beaver County Irr. Co.*, supra.

Washington at all times has recognized that the rights of Oregon were vested in accordance with those principles. Its Public Service Commission treated the Gardena right as a flood-water right, and divided its land into "A" and "B" classes of priority. Its courts in the Ackermann case recognized the benefits Washington was receiving from the irrigation in Oregon, and treated the right as only being entitled to a flow from the sources contributing to its supply in 1892. The irrigators and citizens of Washington by their conduct indicated that they were not entitled to any flow during the dry season from above the Red bridge in Oregon. Notwithstanding the fact that Washington contends that at all times Oregon has diverted water from the Walla Walla river to which its users, and particularly Gardena were entitled, the Walla Walla Irrigation Company, needing additional water, spent during 1910, 1911, and 1912 the sum of $56,451.18 to secure sewage water from the city of Walla Walla for the irrigation of its lands, and during the years 1905, 1909, 1910, 1911, 1913, 1924, and 1925, spent approximately $10,000 for wells in search of new supply. (Master's Report 66; Stip. No. 5; R. 28, 44 to 45).

The stipulation indicates that the sewer diversion was completed in 1911 and 1912.

A compilation of the contracts sold (appearing in Stip. No. 5; R. 29–37) shows that in 1912 contracts had been sold for 2,847.94 acres; in 1924, contracts had been sold for 4,980.26 acres. They had apparently added more than 2,000 acres during the period they were using this sewage water (thus increasing the demand upon the ditch), and the abandonment of the sewage caused them a loss of a portion of the water supply.

Furthermore, it is to be noted that the testimony of Clifford Riggs (Wash. Nar. Test. 52) and D. H. Smith (Wash. Nar. Test. 56), to the effect that the canal never went dry until the summer of 1924, coincides with the date of the abandonment of the sewage water from the city of Walla Walla.

The increase in acreage irrigated, along with the abandonment of a part of the water supply, obviously caused the ditch to go dry.

Our cycle of dry years doubtless contributed (Or. Abs. Powers, p. 100).

The expenditures made, as shown by the stipulation, for the purpose of securing additional water from sources other than the Walla Walla river, and their failure to demand water from Oregon, prove that in those years the irrigation company recognized and realized their water supply was insufficient, and that they had no demand on Oregon to supply it.

Inasmuch as the Gardena project has never had anything but a flood water right, it would be inequitable and unjust to permit them by this proceeding to increase that right to a full seasonal use by compelling water (which Washington never before used) to be turned down from Oregon, and thereby destroy the long established development in Oregon. The rule of "equality of right" would not permit it.

**Limitation on Gardena Priority by Washington Decree.**

In the Washington decree (Wash. Ex. 12, Decree pp. 69 to 72) the Washington court awarded to the Walla Walla Irrigation Company a right with priority as of 1892 to irrigate about 5,000 acres of land then under irrigation and to develop and irrigate additional land until the total of 7,000 acres was reached.

Neither Oregon nor its citizens and irrigators were parties to this decree, so, as shown by our argument, supra, the decree and the priority there fixed has no binding force or evidentiary value as against Oregon.

On pages 74 and 79 of that decree (Wash. Ex. 12) such limitations were placed upon the Gardena right as to make it inferior to both rights of an equal date of priority and rights of a junior date of priority taking water from the main stream.

On page 146 of that decree (Wash. Ex. 12) the decree made the Gardena priority inferior to all water rights (even though junior in priority) on Mill creek and Garrison creek by conveyance through Yellowhawk creek.

These limitations on the Gardena right are quoted and commented on in the Master's Report, pp. 60 to 62 and p. 73.

That a part of these limitations had been placed on the Gardena priority prior to 1917 by the Lowden decree is shown by the testimony of the Washington witness, Hartvedt, who testified (Wash. Nar. Test, p. 69) that in 1917 a part of his duties was to enforce the Lowden decree against Gardena.

These limitations imposed by the Washington courts by the Lowden decree and by the notes on pages 74 and 79 of the decree (Wash. Ex. 12) amount to judicial determinations that the priority of 1892 assigned to Gardena is not a true date of priority, even against those diverting from the Walla Walla river in Washington below the Gardena appropriation.

The limitation on page 146 of the decree (Wash. Ex. 12) is a judicial determination by the Washington court that the priority of 1892 does not run against

appropriators on Mill creek and Garrison creek because in 1892 these streams contributed nothing to the supply of the stream at the Gardena point of diversion during the dry season, and only contributed during the high water season by conveyance through Yellowhawk creek, a distributary of Mill creek.

It is exactly in line with the doctrine of *U. S. v. Haga*, 276 Fed. 41, cited and quoted by the Master on page 73 of his report.

It has the effect of limiting the Gardena right to such waters as flowed at its point of diversion in 1892.

Since evidence, often cited in previous portions of our brief, and the Master's Report (pp. 54, 55, 58, 63, 68, 72, 73, 110, 112, 113 and 114), establish conclusively that from 1880 on no part of the water flowing in the stream above the Red bridge in Oregon was ever permitted to flow down the stream channel or the distributary channels to Washington during the dry season, but that the water flowing into Washington from Oregon during the dry season was limited to that rising in the inner and intermediate zone of springs (Master's Report, p. 58), it is clear that the stream in Oregon above the Red bridge was not, in 1892, contributing anything to the stream supply at Gardena's point of diversion during the dry season.

The application in this case of the same limitation on the Gardena right, with respect to the Oregon diversions from the stream at and above the Nursery bridge, as the Washington court placed upon that right with respect to Mill creek and Garrison creek rights, is called for by an exactly similar situation.

The application of such a limitation will dispose of one of the main issues in this case.

The conduct of the company in seeking to develop other sources of supply and suffering shortage of supply without making any effort to secure any water from the surface flow in Oregon above the Nursery bridge recognized that the limitation on its right did apply in favor of Oregon diverters.

**2) Water Requirements.**

The Master in his report (pp. 75–100) reviews the testimony on the use of water in Oregon and finds (pp. 113, 114 and 115):

"13. The use of water by the irrigators within the state of Oregon is not unduly wasteful but is, under the circumstances, a reasonable, beneficial and necessary use.

"14. The users within the state of Oregon have not diverted or used water in excess of their necessities or in excess of the amounts decreed to them under the Oregon decrees.

"15. The present use of the waters of the Walla Walla river in the two states has grown up normally as the economical division and distribution of such water on lands upon which the water can be most advantageously used and is, as between the two states, an equitable division and distribution of the waters of the Walla Walla river.

"3. The state of Oregon and its appropriators are not diverting and using more of the waters of the Walla Walla river than their equitable proportion thereof."

The importance of this subject is such that we feel that in our brief we should point out the testimony supporting this finding.

In discussing this subject we will consider not only the use of the water upon the land but also the method

of distribution. This involves the so-called "duty of water" in its restricted sense of the quantity of water essential to successfully irrigate a definite quantity of land, and also in the broader sense of the economical diversion and transportation of that water.

In determining the duty of water, various agencies have adopted one or the other of two policies:

(a) The spreading of the water over the largest possible area; or

(b) The giving of each tract the water necessary to successfully and profitably raise crops regardless of the general areas covered.

Those adopting the first policy fix an average duty of water for the whole area; the second fix a maximum duty of water. The first course is an attempt to force all facts and conditions into a theory; the second takes the facts and conditions as they exist and accommodates the theory to fit all the facts and conditions.

Oregon follows the second course. Washington, in this case, has adopted and is demanding the former course, except during flood times when every one helps himself.

The effect of the Washington system is disastrous. Lack of water has compelled its water users to lease water from older rights; to change their crops, to adapt their crops to the new order of things, and to lose money (see Wash. Nar. Test., Cundiff, p. 46; Hastings, p. 47; Sams, p. 48; Danielson, p. 50; Dill, p. 44; Hammer, pp. 24 and 25; Williams, p. 33).

The application of such a rule would have a like effect upon Oregon. Witnesses said:

> "If I miss an irrigation it shows in the quality and quantity of the fruit. * * * If water was

cut down I simply would have to quit the tomato business. * * * If water is cut down it reduces the crop; produces more culls, and the trees shed; the fruit drops off." (Or. Abs., Karker, p. 77; Babcock, p. 79; Hermann, p. 84; Rogers, p. 37; Herr, p. 63; Roeder, p. 45; Rogers, p. 30).

Cutting down the amount of water to a point where it causes a farmer to change his crop, or lose his crop, or change his farm from a profitable one to a losing venture is contrary to law:

"Where an appropriator has a prior right to ample water to irrigate properly a certain tract of land, the successful raising of crops thereon should not be made to give way by an award of a certain quantity of water which would require too great economy in its use." 2 Kinney on Irrigation, (2d Ed.) p. 1594.

"An appropriator, subject to rights in existence at the time his appropriation is made, may take all the water he can use reasonably and without waste for a beneficial project, although it may be the lions' share and none may be left for those who came afterwards." Caviness v. La Grande, 60 Or. 410, 421, 119 P. 735.

See, also:

*Bolter v. Garrett*, 44 Or. 304, 75 P. 143.
*Low v. Schaffer*, 24 Or. 239, 33 P. 678.
*Carson v. Haynes*, 39 Or. 97, 65 P. 814.

The rule is also recognized in Washington:

"It follows that respondents' title to the waters of Antoine creek must date from the time of their entry in 1914, at which time they were subject to the prior appropriation of the appellants who, as the evidence shows, will probably need the entire flow in the dry

season of the year. * * * It is unfortunate that the flood waters of Antoine creek can not be conserved for the use of all, but so long as our laws measure the rights of the appropriator of water by the necessities of the dry season, the first in time must be the first in right. The just purpose of the trial judge to apportion the waters can not be sustained in the light of the evidence showing that there is no excess of water running to or waste by appellants. * * * This cause is remanded with instructions to enter a decree fixing the amount of water actually necessary to irrigate the lands of the appellants, even to the full flow of the stream in the dry season, leaving the residue, if any, subject to the riparian right of respondents." Avery v. Johnson, 59 Wash. 332, 109 P. 1028.

The federal courts have announced the same doctrine:

"Beyond question, under our laws a party may be protected in the use of all the water he actually appropriates and uses, even if it be every drop that flows in as great a river as the Snake." Trade Dollar Co. v. Fraser, 198 Fed. 587, 594.

This agrees with the opinion of scientists who have made special studies of irrigation. Harding says (Or. Abs., p. 127):

"A decree applying any uniform rate to a large area should have a rate liberal enough to cover the requirement of the main portion of the coarser types of soil. * * * Within that area not recognized by the decree but probably existing, one could find small areas where perhaps the land could be handled on a smaller allowance, but those areas are so scattering and their extent is such that it is not feasible to distinguish them in the decree."

Carter says (Or. Abs., p. 139):

"I think there is a tendency on one side to approach a theoretical minimum, opposed on the other side by poor, haphazard farming, or just use of water. The problem as I see it, and the theory I pursue is to reach a reasonable meeting ground between the two extremes."

And, at page 137 (Or. Abs.), says:

"In my experience the quantity of water available has a relation to the production and prosperity of the project. The general prosperity of the project is quite largely affected by the available water supply. Considering one project in comparison with another, the water will be a very close measure of that project's prosperity. As the water supply diminishes, land values will diminish proportionately to the available supply which fixes the crop production. So eventually, if a water supply is spread out too thin and a man's farm is spread out over too much area and not enough production per acre, he comes to the point where his taxes and his over-head cost of farming and things of that nature exceed his return. The intensity and diversity of farming is affected by the available supply of water. With a continuous supply of water of a fairly generous proportion, it is possible to have diversified cropping so that within a rather wide range he may pursue his own desire in the matter of crop selection, while if the supply is limited there will be two or three crops grown with profit. Crop yields increase with available water supply."

Dr. Powers refers to bulletins showing the effect, on crops, of insufficient water supply (Or. Abs., p. 100).

These opinions of Mr. Harding and Mr. Carter are especially applicable to the Milton-Freewater com-

munities, because a reference to Young's soil map (Wash.'s Ex. No. 15) shows that between four and five thousand acres of the lands irrigated in that district are of the coarser gravel (No. 3) lands, and virtually all of the lands irrigated during the dry season of the year are of that type and require the maximum amount of water to irrigate them.

These opinions agree with practical work in the field. Mason, the water master in Oregon, says (Or. Abs., p. 58):

> "* * * As a matter of administration we can not differentiate between the soil classes upon the gravel fan and the up-river soils. The soil is so general in character it would take a very minute detailed measurement, and it seems to me would be impractical as far as distribution is concerned. With my knowledge of the territory and my familiarity with the water rights. I can not pick out on the Young's soil map the areas of soil in each man's holding; that is, the different classes of soil in each man's holdings. * * *"

Humphrey, assistant state engineer of Oregon, in charge of water studies and distribution, says (Or. Abs., pp. 90 and 91):

> "* * * I have attempted to ascertain the areas of the different classes of soils. I have examined it to ascertain whether I could take that soil map and the Oregon decrees and from them determine the particular kinds or quantity of the particular kinds of soil upon the holdings of the various individuals, and I believe it would be an impossibility."

See, also, Or. Abs., Powers p. 94, Harding, pp. 111 and 112.

This leads us to consider how the essential duty of water is determined:

> "World-wide experience in the use of water on cultivated crops during long periods of years, shows that the duty varies with (1) the reaction of the soil; (2) the age of the soil; (3) the kind of crop; (4) weather conditions; (5) the slope and condition of the conveying channels of supply; (6) the distance the water is carried in the ditches and channels to the fields, and, (7) the experience and skill employed in irrigation." 2 Kinney on Irrigation, (2d Ed.) p. 1595.

The Oregon court says that the amount of water that may be taken by a prior appropriator for irrigation depends on the number of acres of irrigable land susceptible of cultivation, the degree of sterility of the premises, the most profitable crops that can be raised by artificial application of moisture and the quantity of water necessary to produce the harvest by careful husbandry. (*Donnelly v. Cuhna*, 61 Or. 72, 119 P. 881). And the character of the soil and climate (*Little Walla Walla Union v. Finis Irrigation Co.*, 62 Or. 348; 124 P. 666; 125 P. 270). The water lost by leakage of the ditches and flumes of the appropriator, reasonable care and diligence in their construction and maintenance being had, will be considered (*Joseph Milling Co. v. City of Joseph*, 74 Or. 296, 144 P. 465). The water of the various users will be measured at the point of diversion (*Little Walla Walla Union v. Finis Irrigation Co.*, supra).

### Washington's Evidence

Washington, being the complainant, has the burden of proof in establishing her contentions as to the duty of water (see our argument under Burden of Proof).

To meet that requirement, the state of Washington called Marvin Chase, Wm. W. Johnston, Carl A. Larson, and James G. Woodburn.

MARVIN CHASE is a man of wide experience in irrigation matters, and has known the Walla Walla basin since 1917, yet with all of this experience he was only called to testify concerning an estimated acreage of different classes of soil based upon his conclusions from the decree (Wash. Ex. No. 1) and Young's soil map (Wash. Ex. No. 15), and regarding the alleged waste up-stream in the canyon above Milton, and in the Milton ditch.

The acreage covered by his testimony in the up-stream territory is inconsequential as compared with the great body of irrigated land from the Walla Walla river in Oregon. The up-stream territory above Milton is a narrow canyon bordered and floored by solid basaltic rock from which no water can escape, and in which all water taken from the stream for irrigation and not used by plant life or lost by evaporation returns to the stream (Wash. Nar. Test., Chase, p. 21; Or. Abs., Perry, p. 48; Mason, pp. 52 and 53; Harding, p. 124).

The tabulations were admitted by counsel for the state of Washington (Wash.'s Ex. 20, 21, 22 and 23) to be estimates only and merely illustrative of the data on the Young's soil map. It is admitted that it is impossible to make a real estimate (Wash. Nar. Test., p. 10).

Chase made no measurements and gave no calculations of the amount of any loss. He simply makes the statement that such method of diversion is wasteful

The head of the Milton ditch is in an old channel of the river (Wash. Nar. Test., Chase, p. 15). Mason testified that it was originally the main channel (Or. Abs., p. 54). The appropriation of the Milton ditch having been made from the original channel of the Walla Walla river, it has the right to insist that water continue to flow as it did when it first made its appropriation. (2 Kinney on Irrigation and Water Rights, (2d Ed.), p. 1398).

The language of the law under the Arid Region Doctrine of appropriation is "The appropriator took the water with the right to have the stream flow as it was want to flow." Seepage losses in the old channel can not be charged up against the Milton ditch appropriation.

Chase further testified that the diversions upstream were temporary, and that at small expense permanent structures could be put in; but Mason says (Or. Abs., p. 53):

> "* * * The changing character of the stream and the banks is one reason for that. When the river recedes I go on the upper river, check on the quantity used, and regulate their headgates in that particular section. I usually regulate it at the spillway. On that section of the river it is almost impossible without an enormous expense to keep anything that would withstand the river pressure; it would cost more than a small irrigator could invest."

The acreages irrigated from these diversions are very small and, certainly, the practice of the farmers in the canyon above Milton is reasonable under the circumstances.

JAMES G. WOODBURN, a man well educated as a civil engineer, and professor of hydraulic engineering at the State College of Washington, has never had any experience with the distribution of water for irrigation. He first came upon the Walla Walla project in June of 1932, when he spent two months in field work, office work, and computations. Again, in 1933, he spent two months in the study of the stream, no part of which time was during an irrigation season. He took the Oregon decree (Wash. Ex. No. 1) and the stream flow records (shown in Wash. Ex. No. 18), and from that data, without reference to the conditions in the field, attempted to demonstrate a system of distribution from which Washington might receive from Oregon an additional supply of water. He assumes that the return flow to the stream is equal to the seepage losses and the use of water in the canyon above Milton (there is no testimony supporting this assumption), although he found that over a distance of two miles in the Crockett branches there was a loss of 17 per cent (Wash. Nar. Test., pp. 136 and 137).

A tabulation of Woodburn's conclusions appears in Washington Exhibit No. 30. The effect of taking the water supply as given by Woodburn and applying it to the acreage actually irrigated under field conditions is shown by Oregon's Ex. No. 44.

A comparison of Exhibit 44 with table IV of Washington's Exhibit No. 30 shows that Woodburn's acreages were wrong. It shows that he did not take into consideration transportation losses in the natural channels, or the increase of water allowed by the Oregon decree, where the size of the tract is less than one acre.

Considering the actual conditions in July for the territory below Milton, in place of an over-diversion of 14.95 c.f.s. there was only an over-diversion of .81 c.f.s.; and for August instead of an over-diversion of 10.07 c.f.s., there was an under-diversion of 4.5 c.f.s.

Woodburn based his calculations on the mean flow of the channel or ditch for the entire months of July and August. The Ford branch had a mean diversion in July of 20.42 c.f.s.

Washington's Exhibit 18 (p. 114) shows 11 days in July with flow in the Ford branch below the mean. For August the mean flow was 18.45 c.f.s., and it shows that during that month there were 17 days in which the flow was below the mean. A similar condition existed on the other channels and ditches.

The stream is flashy, subject to frequent and sudden rises and falls (Stipulation No. 3, Par. 1; Or. Abs., Mason, pp. 59 and 61). No tabulation based upon the mean diversion per month can possibly show the water actually received by the irrigator.

Oregon practices rotation. If the flashy rise of the stream comes when one irrigator has the water, he may have an over-diversion and the benefit of such rise. On the other hand, when the next irrigator in the rotation plan receives his supply the water may be down and he will suffer an under-diversion. A theoretical mean flow upon a flashy stream can not be used to prove an over-diversion.

Neither Chase nor Woodburn attempted to testify as to the amount of water required to irrigate an acre of land in the Milton district. While this would not be expected of Woodburn, yet Chase (being the one

Washington witness qualified by his years of experience in irrigation matters) was the one to give such testimony.

Certainly, the rule of evidence applies that, where better testimony is within a party's reach and is not produced, the presumption is that it would be unfavorable to his contention.

WILLIAM W. JOHNSTON has had some experience in irrigation matters. He went to school and worked under Dr. Powers, a witness for the state of Oregon.

For the purposes of water requirement, he divides Dr. Young's soil types into two groups; Young's class 3 and 2-B lands he places in group "B", and recommends nine-tenths inch per acre, and the balance of Young's classes he places in group "A", at one-half miner's inch per acre.

The force of his conclusions is weakened by the following circumstances appearing in his testimony:

Mr. Johnston never conducted any duty of water experiments on the class of soils found around Milton, and although he has watched irrigation on gravelly soils, he, himself, never handled water on such soils (Wash. Nar. Test., pp. 189 and 190).

He bases his testimony almost entirely upon his experience at Sunnyside, Washington, and states that class 3 soil here falls between two types of soil he encountered there. He made no soil tests other than a soil examination of the profile for comparative purposes, no determination of the soil content and water capacity, and no laboratory test (Wash. Nar. Test., p. 195). He admitted that the holding capacity of the soil here is much less than in the No. 5 soil in the Sunny-

side division. He also stated that long years of farming is the best demonstration of what is actually needed (Wash. Nar. Test., p. 193), and that the high-water requirement on the class 3 lands is due to the fact that the water-holding capacity is low and frequent irrigation is required (Wash. Nar. Test., p. 184). He describes the soil as being coarse gravel mixed with soil down to about 16 inches, and from then on down to the cement gravel as exceedingly porous and very loose (Wash. Nar. Test., p. 199).

Johnston minimizes the effect of existing extraordinary conditions and attempts to adapt his Sunnyside plan to local conditions. He attempts to force all facts and conditions into his theory in place of altering his theory to conform to all the facts and conditions.

The weight to be given his testimony is therefore dependent upon the extent to which conditions in the Sunnyside project are comparable to the Milton district. Johnston, himself, states that both Powers and Harding are familiar with the Sunnyside project (Wash. Nar. Test., p. 90). Both Powers and Harding say that the conditions are entirely different and the soils not comparable (Or. Abs., Powers, pp. 101 to 103; Harding, pp. 113, 114, 131, and 132).

CARL A. LARSON (Wash. Nar. Test., pp. 152, et seq.) testified that he was engaged as United States agricultural agent cooperating with the Irrigation Branch Experiment Station at Prosser, Washington. He also groups the soils into class "A" and "B" as did Johnston. In his opinion one-half miner's inch per acre is sufficient for group "A" and one miner's inch for the group "B", or 18 acre-inches per month.

That his conclusions are entitled to but little weight is shown by the following:

He testified that class 3 soils will store very little water from one part of the season over to the other. He did not consider any of the use records for particular lands, although with limitations the use which has been made of water is the important factor in determining the duty (p. 162).

He studied the No. 3 lands around Milton. The heavy soil carried down pretty well through the first foot; after that it became quite coarse. He made no study below the first three feet. The texture of the soil below the first three feet where it becomes coarse has a great deal to do with the vertical drainage which is a very material determining factor in fixing the head of water necessary to get over a tract of land and irrigate it after considering the surface (p. 163).

Larson said the expense the irrigator has gone to is a matter for consideration, and if an irrigator has used every efficient method and has gone to the expense of putting in a pumping plant, especially during years of low prices, it would be powerful evidence that his gravity supply was too small (p. 164).

Larson is not a man of great experience. He is barely out of school. He has had no experience with class 3 soils. He made no tests to determine the moisture-holding content. He found no fault with the methods of irrigation in Oregon, except as to length of some of the irrigation furrows.

He attempted to apply his theory, developed at Prosser, on class 1 lands there, to the lands here where conditions and requirements are entirely different.

The weight to be given his testimony under such circumstances can not be great, for he says that his conclusions are not based upon actual present knowledge of his own, except by comparison (p. 168).

Although the soil map shows that there are areas of gravelly land of class 3 soil in the state of Washington (Wash. Ex. No. 15), yet no practical irrigator was called by the complainant to show that any such land in Washington had been successfully irrigated by a lesser amount of water than that used in Oregon. The testimony of all practical farmers in Washington, who own lands near the gravelly soil, is to the effect that they did not have sufficient water after the Washington duty of water was established.

**Oregon's Evidence.**

The testimony of practical farmers is favored by the courts:

> "* * * In its investigation the court can not say that the testimony of experts as to the amount of water used or required must be accepted as against the farmers of the Vicinage who had been living in the valley and using the water for several years. * * * A reference as to what was said by this court in Union Mill and Mining Co. v. Dangberg, 81 Fed. 99, 100, without comment shows that even experts are liable to make mistakes in their methods of using water, and in their judgment as to the amount of water necessary to irrigate an acre of land." Rodgers v. Pitt, 129 Fed. 932.

See, also, *Robertson v. Wilmoth*, (Colo.) 90 Pac. 95 at 96, where the court followed the testimony of witnesses who:

> "* * * had lived on the creek twenty years, and were thoroughly familiar with the water condi-

> tions in the creek; were practical irrigators; had used the waters of the creek in controversy for the irrigation of their lands during the 20 years last passed, * * *."

in preference to that of expert witnesses. (See, also, Wiel, Water Rights, (3d Ed.) 507).

In order to check up on the water actually used by farmers in irrigating their crops, the state of Oregon picked out nine separate tracts of land farmed by representative farmers of the district and measured the water used on each of these places. These tracts were located in different parts of the related territory in Oregon. In order to cover the actual conditions existing on each place, the results of these measurements were tabulated by Mr. Humphrey and placed in evidence as Oregon's Ex. No. 42. Each of them were supplied with water during the whole irrigation season except the place of W. R. Bookout, whose land is situated under the Pleasant View ditch. (The water in the Pleasant View ditch was shut off on the 4th day of July because of the late priority date). Each of these test places showed the use of water at or about the quantity set by the Oregon decree, and each of these practical farmers testified that the water received by them was necessary to raise their crops (see Or. Abs., Babcock, p. 77; Bookout, p. 82; Eiffert, p. 79; Harris, p. 82; Herman, p. 83; Herr, p. 84; Karker, p. 76; Knopf, p. 61; and Roeder, p. 41).

In addition to this, the testimony of Elba and Alta Rogers, both practical farmers, is to the effect that one and a half miner's inches per acre was necessary to irrigate the lands (Or. Abs., Alta Rogers, p. 33; Elba Rogers, p. 28). Even though the Oregon decree fixed the duty of water at one and a half miner's inches per

acre, yet when that decree was placed in effect the amount of water used by some of the irrigators was cut down (Or. Abs., Forsythe, p. 27; Elba Rogers, p. 29; Alta Rogers, p. 34; Warren Roeder, p. 43).

The process of establishing an economical system of distribution of the water was started when the water masters went on in 1913. The last main divide was put in in 1919, the year Roeder left the job (Or. Abs., Roeder, p. 42).

The method used for distributing the water on the farms is about the same all over the district. It is the furrow method (Or. Abs., Ella Rogers, p. 31; Stipulation No. 3, Or. Abs., p. 4). Rogers has made his living on, and fully developed, a 3½-acre tract of land. He runs his ditches three feet apart and not quite 40 rods long (Or. Abs., p. 31); Alta Rogers runs his ditches 20 rods long (Or. Abs., p. 35); Roeder, 20 rods (Or. Abs., p. 44; and Babcock, 20 rods (Or. Abs., p. 78). Eiffert has three runs in 75 rods (Or. Abs., p. 81); while Hermann has ditches varying from 15 to 40 rods (Or. Abs., p. 84). These are the standard of runs all over the related territory, and produce good results.

Harding says that the general character of practice as to length of furrows, and the arrangement of the land is representative of that usual under similar conditions (Or. Abs., p. 113), and that the general length of 330 feet is not unreasonable (Or. Abs., p. 129).

Carter testified that the farming practice was good, and the irrigation appliances and the distribution of water was all that might be expected under general economic conditions, and not out of line with good irrigation practice (Or. Abs., p. 136).

Witnesses for the state of Washington, while expressing the opinion that the run should be shortened, admitted that the 20-rod length of furrow was not unreasonable if, in the development and progress of irrigation in the community, the use of such furrows had been found economical (Larson, Wash. Nar. Test., p. 165; Johnson, p. 193).

The effect of cutting down the water on tomatoes causes them first to wither, then the fruit gets smaller as it ripens, and the smaller fruit goes into seconds and then culls because too small for the market (Or. Abs., Elba Rogers, p. 30). Cutting down water on apples makes the fruit small and they do not color well. This makes apple raising unprofitable (Or. Abs., Alta Rogers, p. 37; Karker, p. 79).

The effect upon prunes and cherries is to reduce the crop, produce more culls, and cause the trees to shed and the fruit to drop off (Or. Abs., Eiffert, p. 81; Roeder, p. 45; Hermann, p. 84). Where the supply of water is insufficient it causes a drouth spot, or brown spot on prunes (Or. Abs., Herr, p. 63); and a black spot on apples (Or. Abs., Karker, p. 77).

In the irrigation of the various farms in the related territory in Oregon there is no waste (Or. Abs., Humphrey, pp. 89 and 90). Elba Rogers takes eight rows and gets over his land in 24 hours, and keeps irrigating night and day. There is very little run-off; sometimes enough for his neighbor below to use it, and at other times not enough. It is all used and none wasted (Or. Abs., Elba Rogers, p. 31). The system is to catch the waste water and use it again (Or. Abs., Alta Rogers, p. 39; Roeder, p. 43). The practice of using a tail-ditch to catch the overflow of the furrows is considered

by Harding to be a reasonable and desirable practice (Or. Abs., p. 113). Johnston also thinks the practice desirable (Wash. Nar. Test., p. 185).

The conclusion of Washington (stated on pages 118 and 119 of their brief), that the Oregon practice utilizes eight to 10 delivery ditches to water the lower groups of furrows, is not substantiated by the testimony. There is a separate head-ditch to the lower group of furrows which conveys the water for their irrigation, but to the extent of any unavoidable run-off from the upper furrows it is picked up and utilized on the lower (Or. Abs., Roeder, p. 43). This prevents waste.

By vague, general charges of waste, and by calling attention to the practice on the stream above Milton where the acreage is small and there is a prompt return flow to the stream of any excess diverted, Washington has not proven waste.

Much of Oregon's distribution of water is through natural channels which do away with the need of long conveying canals (Or. Abs., Harding, p. 114). In these there is a loss by seepage and deep percolation (due to the nature of the soil) which the witnesses said ran around 20 per cent (Wash. Nar. Test., Woodburn (15 per cent to 17 per cent in 2 miles), p. 137; Or. Abs., p. 48, Perry (8 per cent per mile); Mason (15 per cent to 20 per cent), pp. 54 and 60; Roeder (15 per cent), p. 42; Spencer (17 per cent to 22 per cent), p. 143). Harding says a 20 per cent seepage loss is reasonable (Or. Abs., p. 114).

Such seepage loss is not waste. It always existed as a natural condition and is less than most canal losses (2 Kinney on Irrigation, (2d Ed.), p. 1601, § 907; 1 Wiel, Water Rights in Western States (3d Ed.), 525 to 527).

Oregon properly makes allowance for this channel loss in administering the stream system.

Owing to the slope of the land in the related territory, which has a gradient of about 80 feet to the mile, the porosity of the soil, the shallow depth of the mixture of soil with gravel, and the lack of a supporting water table, it is necessary for irrigators to divert a large head of water in order to get over their land (Or. Abs., Harding, p. 113). In such cases there necessarily is some run-off, and, where the farmer does not own sufficient land to catch this run-off in tail ditches and irrigate his own land with it, such run-off goes down for the neighbors to use. This is not waste (*Beasley v. Engstrom*, (Ida.), 168 P. 1145). It is an economical use.

The frequency of the application and the amount of water required per application to the lands determine what is necessary for irrigating that land (Or. Abs., Harding, p. 116). Stipulation No. 3 (Or. Abs., pp. 3 and 4) shows that, outside of the gravelly soil, water is supplied about once every two weeks. In areas of gravelly land it is once a week for orchards, alfalfa and grain, and from two to three times a week for strawberries, tomatoes, garden vegetables, and short-rooted crops. This stipulation is also borne out by the irrigators (Or. Abs., Elba Rogers (p. 30), every three days; Alta Rogers (p. 39), from three to four days; Roeder (p. 44), one week; Herr (p. 63), for trees every six days, and garden twice a week; Karker (p. 77), trees once a week; Babcock (p. 79), four and a half days; Eiffert (p. 80), orchards every eight days; Hermann (p. 84), less than a week.

This interval has been checked by Powers, and agrees with the water-retaining quality of the soil (Or.

Abs., p. 105). He says that the No. 3 lands should be irrigated once a week for tree crops and for tomatoes at least twice a week to prevent wilting. Harding agrees that the frequency required checks with the information as to soil (Or. Abs., 117).

Harding (Or. Abs., p. 116) says:

> "The landowner may not be familiar with methods of measuring water so as to determine or know the quantity of water which he uses, but I have found in all of my experience that actual irrigators can and do know the frequency with which it is necessary to irrigate their different crops * * * The irrigator is in the best position to determine any injury to the crop from too long a delay in the times of irrigation, and has a more constant contact with the soil and the crops than is obtainable otherwise."

Johnston corroborates this (Wash. Nar. Test., p. 201).

In all the record there is no testimony to contradict the necessity of this frequency of irrigation. It can, therefore, be taken as an established fact.

The amount of water required for each irrigation is fixed by Oregon witnesses as follows: Harding, 5 to 6 inches (Or. Abs., pp. 118 and 119); Carter, 5 to 6 inches (Or. Abs., p. 135); Powers, 5 inches (Or. Abs., p. 99). Larson, Washington's witness, fixes it at 4 inches, without allowing anything for deep percolation (Wash. Nar. Test., p. 168); which is unavoidable (Or. Abs., Harding, p. 120). Johnston said "close to six inches" (Transcript, p. 985).

Oregon's method of distribution of water from the streams is economical. The first decree was rendered upon the Walla Walla river in Oregon in 1912 (Or. Ex.

31). A water master was put upon the stream (Or. Ex. 32), and at that time there was only one concrete diversion works. There were wooden divides and headgates of different patterns, with cracks and holes around and under them (Or. Abs., Roeder, p. 41 et seq.) The water master began to encourage improvement of the stream. Seepage losses were checked, concrete divides were put in, and the water was measured to the water users on the gravel sector on the basis of 1½ inches per acre (Perry, Or. Abs., p. 46 et seq.). Since 1921 Mason has been the water master (Or. Abs., pp. 52 et seq.). He usually starts regulating the stream in May and June and makes careful adjustments. On the Ford and Crockett branches water is delivered to the water users through proportionate weirs, and the control is exercised at the frog (Or. Abs., p. 57). The gate at the frog is adjusted so that exactly enough water goes down to take care of all diverters upon the channel. It takes about four days to adjust and cut out priorities on the Ford and Crockett branches, and about two days to adjust other diversions. Whe[illegible] he discovers waste, he cuts down the irrigator's [illegible]of water until the irrigator changes his system, in order not to make a wasteful use (Or. Abs., p. 55). Waste is remedied immediately in all cases (Or. Abs., p. 56).

When there is high water so that there is plenty for every one, no attempt is made to measure the water to any irrigator or prevent waste. When the water is low, both the water master and the irrigator keep a check on the amount of water delivered.

Rotation is practiced wherever possible (Or. Abs., p. 56). By reason of the flashy nature of the stream there may be at times over-diversions, and sometimes

under-diversions. These are remedied wherever practicable (Or. Abs., pp. 59 and 61).

In the upper stream above Milton the changing character of the stream and the sudden raises in water prevent the installation of permanent diversion works (Or. Abs., Mason, p. 53). The diversions in the canyon above Milton are small and these works are temporary each year. They are what any one would necessarily expect to find on a stream of that nature, and are not unreasonable (Or. Abs., Humphrey, p. 90).

In the whole record there has been no specific amount of loss pointed out that has been caused by the state of Oregon. The testimony of the state of Washington consists of generalities to the effect that the methods are wasteful, and that there is a lack of water-saving devices. But there is no testimony of how much water is lost thereby or of how much water could be saved by installing anything different from what is already used. In and around Milton it would not be economical to line or flume the ditches to any extent under present conditions (Wash. Nar. Test., Johnston, p. 197). Washington did not observe the diversion works in Oregon, and observed no waste in that regard. From all the testimony, therefore, we submit that Oregon has proven that her system of distribution is economical.

Expert witnesses should base their opinions on facts proven. The value of expert testimony depends on the extent of the experience and study of the witness, as well as upon the facts and conditions upon which it is based.

Larson and Johnston, testifying for Washington, placed no facts before the court as a basis for their

conclusions, but merely testified that having hurriedly gone over the territory they have formed certain opinions. On the other hand, Humphrey, Powers, Harding, and Carter, as witnesses for the state of Oregon, have taken the facts and conditions as presented in this court and compared them with similar conditions elsewhere to show the reasonableness and correctness of the Oregon farm practices and duty of water.

HUMPHREY (Or. Abs., pp. 84 et seq.) supervised and gathered together hydrographic data, measurements, and operations on the test places so that all these facts could be assembled in concise form for this court.

He has had some years of experience in adjudication work, and in the determination of water requirements. He was on the ground while irrigation was in progress; actually saw the application of water, and the results. He fixes the duty of water at one and one-half inches per acre on the gravel lands, and from one to nearly one and one-half inches per acre on the other lands (Or. Abs., p. 90). The actual application of such amounts did not produce waste (Or. Abs., p. 90). Because of his practical experience, and because they are based on actual knowledge of local conditions, his conclusions deserve consideration.

DR. POWERS is a soil scientist in charge of the soil department of the State College of Oregon at Corvallis, and has had 27 years of experience in irrigation and drainage investigations (Or. Abs., pp. 92 et seq.). He is thoroughly familiar with local conditions and has watched actual irrigation on the lands involved. He describes the soil classifications and gives the soil analysis of the No. 3 lands in Oregon. He has also de-

termined the storage capacity of the class 3 soil by actual scientific examination and tests, and found that the most storage capacity is in the first two feet, and is from two to two and one-half acre-inches, so that class 3 soil would retain perhaps two and one-half to three acre-inches of water per irrigation (Or. Abs., p. 99). There is no question about the definiteness of this determination because he describes his method of analysis. The effect of frequent irrigations determines the size and quality of the fruit. He states that an experiment carried on at Medford with pears showed that, where frequent irrigation was applied without allowing the moisture to decrease to the wilting point, the size of the fruit was increased 30 per cent, and the growth of the tree was from 30 to 40 per cent better (Or. Abs., p. 99). Experiments have shown that the feeding root zone of trees is largely in the first two to two and one-half foot area, and they extract from 50 to 68 per cent of the moisture in the soil within that area.

Considering the nature of the soil, its slope, and the water supply, Powers states that it would be difficult to apply less than five acre-inches at one irrigation (Or. Abs., p. 99), and that a continuous flow of one and one-half miner's inches is necessary to irrigate one acre (Or. Abs., pp. 99 and 105). Being an unusual soil, it requires an unusual amount of water to irrigate it. He fixes the duty for the other soils as follows: 1, 1-R, and 1-D soil, four-sevenths inch; 2-T soil two-thirds inch; 2-A soil one and one-sixth inches (Or. Abs., p. 106).

S. T. HARDING, who is professor of irrigation at the University of California, is perhaps the most widely-known authority on irrigation matters in the nation. He has specialized in irrigation since 1907. He made a special study of the data and conditions existing

in and around Milton. A reading of his testimony (Or. Abs., pp. 110 et seq.) is convincing, and is required to determine the weight to be given it. He delineates to the court the things that he has considered and studied. He checked the irrigation practices and the soil conditions with other projects which he has seen. He has studied the available data more thoroughly and more understandingly than any other witness.

The findings of Dr. Powers in his analysis of the soil check with Harding's experience. He took the data gathered in this case and from it by mathematical calculations deduced that one and one-half miner's inches per acre is rightly used and required (Or. Abs., p. 119). His examination of the farms convinced him that their irrigation practices are reasonable; that the test places were representative of the whole district; that there was no waste, and that fixing the duty of water at one and one-half miner's inches per acre is not out of line with the standards found to exist in other projects. His testimony shows his conclusion to be a matter of scientific determination from record facts. It is not a guess.

GEORGE H. CARTER began his work in irrigation and engineering in 1908, and from 1921 to 1931 was Director of Water Resources and Commissioner of Reclamation for the state of Idaho in direct charge of all irrigation matters (Or. Abs., p. 132).

Several projects in Idaho have similar conditions and quite similar soil as exists around Milton and Freewater. He took the facts and data presented before this court, compared them with familiar projects in Idaho showing similar soil analysis, made an investigation of field conditions in and around Milton, considered the

seepage, the frequency of irrigation, and the crops. He was of the opinion that the minimum of water that could be applied to the lands in one irrigation was from five to six acre-inches. This opinion checked with his experience on the projects in Idaho with which he is familiar. He calculated the amount of water used upon the test places; defined his method of calculation, and demonstrated one and one-half miner's inches per acre was a reasonable requirement. In his opinion, it would not be permissible or of any value to take the stream flow for an entire irrigation period over six or seven months, average it up, and say that it is the amount that can be beneficially applied each month (Or. Abs., p. 138). It must be based upon the available supply in the critical months. Based upon fact, the duty of water must be fixed at one and one-half miner's inches per acre.

The supreme court of the state of Oregon has twice approved this duty of water upon these Oregon lands. In the case which started in 1905, the court held:

> "* * * The tendency of the water to sink is indicated by what is known as the Rogers underground ditch. Mr. Rogers has a tile underground ditch a distance of one-fourth mile. Where it emerges on his place the flow is, at times, as much as 1.43 second-feet, and most of the time it is more than .50 second-feet, which, he testified, furnishes no water in the winter or when the water is confined to the channel of the stream; and that it flows the greatest quantity when irrigation is most extensive, indicating that there is a great loss from seepage from the ditches and irrigated ground. It is apparent that the ground in question requires much more water than would be required for loam or other fine soils.

"C. L. Swain and O. L. Waller, who were called by plaintiffs as witnesses, are experts in the measurement of water; but their knowledge of the duty of water is derived largely from hearsay, theory, and observation of its use upon land in another locality. They fix the amount of water needed upon volcanic ash land as one-half inch to the acre; but upon other soil of the valley from one and one-half to two inches; upon coarse gravelly soil, two inches to the acre. Other witnesses, not experts in measuring or estimating water, but with experience in applying it in irrigation, testify that the ground needs more than one and one-half inches. Plaintiffs cite the testimony of A. Miller, as to the need of water on his volcanic ash land; but in his case the water is raised directly upon the land and is carried for distribution in board gutters, so that there is little if any loss by seepage or evaporation, which fact must be taken into account in considering his estimates. The 250 gallons per minute, raised by the pump, equals .554 second-feet or .31 inches per acre, so that his testimony as to the amount needed on the land under the Milton ditch does not vary much from that of Swain and others, viz, one and one-half inches.

"The lands of Rogers and Shaw, who testified to the amount of water they use, and the amount needed, are located down the valley where the subsoil is full of water from the irrigation above, as indicated by the Rogers underground ditch, above mentioned. As to the smaller tracts, several in one locality should rotate in the use of water, so that each may have a larger head while applying it, with less waste. Although there may be some tracts that need less water than others, they have not been segregated or identified, and we find that, except as to the Miller tract, an inch and a half, miner's measurement under six-inch pressure, per acre, is necessary and sufficient to irrigate the lands of the defendants, except tracts in vegetables and small

fruits which require two inches to the acre. * * *"
Little Walla Walla Irr. Co. v. Finis Irr. Co., 62 Or. 348, 353, 354, 355.

There can be no question under the undisputed evidence in this case that, as to all of the lands mentioned in the decree entered upon the mandate on that case (Or. Ex. 31), the decree, based upon that duty, has been administered ever since for a period of more than 20 years. The decree, of course, relates back to the inception of the suit, which was in 1905, or almost 30 years ago.

Again in Washington Exhibit No. 1 the decree on the mandate in the Oregon adjudication fixes the duty of water as follows:

> "The soils of the Walla Walla valley, as a whole, are comparatively shallow and porous, underlain with a loose gravelly soil, the condition changing to a more tight soil in the northern end of the valley near the state line. Based upon the testimony and other available data as to the needs, the duty of water is hereby fixed and determined to be one and one-half miner's inches per acre, measured at the point of diversion, provided that in no case shall more water be applied to the lands than can be beneficially used thereon. * * *"

We, therefore, respectfully submit that this court should find the duty of water to be one and one-half inches per acre. This amount of water is especially required on account of the small acreage of farms in Oregon, being an average of 7.01 acres per farm.

Other states have recognized the need of the larger water requirement on such lands:

> "* * * The evidence discloses that the Boyer land is rocky and gravelly, and requires a greater

amount of water to the acre than does that of appellant, and, in addition to the condition of the soil, the fact is established that little use can be made of less than an irrigating head, and that the small area under cultivation by respondents warrants an award of sufficient water to constitute a fair head of water. The award of two inches to the acre is justified by the evidence." Boehler v. Boyer, (Mont.), 234 Pac. 1086 at 1089.

The state of Idaho has allowed an even lower duty on gravel fans in the Snake river project and Upper Wood River valley (Or. Abs., Carter, pp. 133 and 134).

A convincing proof of Oregon's need of the amount of water they are using is furnished by the fact that there are over 300 wells on the gravel fan from which water is pumped for irrigation (Stipulation No. 3, Par. II, Or. Abs., p. 5). Oregon Exhibit No. 42 shows the amount of water pumped and the expense incident thereto on some of the wells. The total expense of such pumping runs to about $15,500 in a year (Or. Abs., Humphrey, p. 86). The fact that the farmers go to this expense tends to prove their need of water (Or. Abs., Carter, p. 138; Wash. Nar. Test., Larson, p. 164; Johnston, p. 193).

Washington tried to combat this proof by another theory of Dr. Woodburn (Wash. Nar. Test., pp. 149 to 152), to the effect that because of the rate schedule it might conceivably become cheaper to use electric power in place of paying for labor. Farmers in these times of stress do not pay for labor to spread water on 7.01-acre farms; nor do they pay their money for electric power unnecessarily.

The testimony of Oregon's practical farmers, corroborated as it is by the testimony of her experts (men of unquestioned qualifications and ability), and based upon actual facts proven and stipulated, must far outweigh the testimony of Washington's witnesses Johnston and Larson, whose testimony is purely theory not based upon facts proven or actual conditions shown to exist. Especially is this true since Washington was unable to call one practical farmer to testify that he could or had raised crops on similar soil with the amount of water Washington contends is sufficient for that purpose.

On this issue it must be held that Washington has again failed to meet the burden of proof.

The water requirement of the Oregon soil is fixed by judicial pronouncement and years of actual practice. The use of the amount of water they have had during all these years has resulted in intense cultivation, remarkable development, and unusual crop production. The necessity for the continued use of that amount of water is proven by the testimony of practical farmers as well as the opinions of experts reached by scientific determination, based on proven and stipulated facts.

Equality of right, equity, the rules of judicial determination, and every consideration of right and justice forbid that Oregon's development (based on this use of water) and the prosperity of its citizens, should be wrecked or even imperiled by following the conclusions (without factual basis) of Larson and Johnston, or the purely academic theories of Dr. Woodburn.

## Underground Water and Wells

If it is Washington's contention that the pumping of water from the wells in Oregon lowers the surface streams along the gravel fan, there is no evidence to support it. All of the evidence is to the effect that the water pumped from the wells is spread upon the gravel fan, which is of highly permeable material where water by deep percolation would speedily return to the ground water (Or. Abs., Piper, p. 72), subject only to some slight lag during the time it sifted through the gravel. The lag would, necessarily, make the water available at a more critical period. The proof is that irrigation from wells does not tend to distribute water further to the west and away from the stream (Or. Abs., Piper, p. 75), but rather that it tends to increase the movement to the north (Or. Abs., Piper, p. 73), where it would become available to Washington irrigators.

The pumping from wells has no perceptible or determinable effect on the ground water supply (Or. Abs., Piper, pp. 71 to 74). The ground water is a wave moving down the slope—a hill of water—and there is no reservoiring under ground, and no static water (Or. Abs., Piper, pp. 69, 71, 72, 75). The waters are purely percolating (Or. Abs., Piper, pp. 69, 70, 73).

Washington's argument is also recited under the heading: "4. Percolating Waters Once Part of Surface Stream."

Basing their position on the case of *Ellis v. Duncan*, (N. Y. 1855), 21 Barbour 230, 11 Howard Practice 515, and citing no other authority, Washington argues that, because the evidence shows the ground water comes chiefly from the freshet in the canyon above

Milton (Or. Abs., Piper, pp. 72 and 73), and that a part of it returns to the stream by percolation at various places along the length of the stream before the Columbia river is reached, the water, while percolating, is still a part of the stream and subject to the rules of law governing the use of surface waters within a stream channel.

*Ellis v. Duncan* holds directly opposite to Washington's contention. That was a case where an injunction was sought to prevent the owner of a farm from digging a ditch to drain his land so as to open and work a quarry upon it, when by so doing he intercepted the underground sources of a spring on his neighbor's land. The court held:

> "It seems to me that the rule that a man has a right to the free and absolute use of his property, so long as he does not directly invade that of his neighbor, or consequentially injure his perceptible and clearly defined rights, is applicable to the interruption of the sub-surface supplies of a stream, by the owner of the soil, and that the damage resulting from it, is not the subject of legal redress."

and denied the injunction.

As we understand it, there is no question in this case but what the underground waters are "percolating waters".

The presumption of law is that underground waters are percolating, and he who asserts the contrary has the burden of proof (2 Kinney on Irrigation and Water Rights, (2d Ed.), 2152, § 1188).

Piper, the expert employed by Oregon, Washington, and the government of the United States to determine

the underground water situation in the related area (Or. Abs., Piper, p. 65), in all cases in describing the movement of the water said: "It percolates * * *" (Or. Abs., Piper, pp. 69, 70 and 73).

The rules of law as to subterranean streams and water courses have no application to the case at bar. There is no proof of any well-known and well-defined channel having beds, banks, and current. The testimony is that the waters

> "Percolate radially outward down the slope of the fan in a rudely conical form, could pass along the western-most edge of the fan, to the northwest, or nearly northward" (Or. Abs., Piper, p. 70).

The rules of law governing under-flow of surface streams and water supporting the surface flow in the channels have no application here, since the record is barren of any testimony that the use of the wells for irrigation in any way affects the supply of water in the surface streams at or above the pumping area. The testimony does disclose that the ground water rises and falls in relation to the stream, but after the rise and fall of the stream (Or. Abs., Piper, p. 72), and that the water level is on a slope away from the stream on the gravel fan (Or. Abs., Piper, pp. 69, 70, 74). On such a slope, without any pumping, gravity would take the water away from the stream (Or. Abs., Piper, p. 69).

The evidence is undisputed that there is no underground reservoir or lake (Or. Abs., Piper, pp. 69, 71, 75).

The pumping from wells is high on the gravel fan (Or. Abs., Piper, p. 71). The ground water there is percolating radially outward over the whole fan

(Or. Abs., Piper, p. 70). No man can say whether the water pumped would have percolated west, northwest, or north (Or. Abs., Piper, p. 70), or whether it would have appeared in the inner, the intermediate, or the outer zone of springs (Or. Abs., Piper, p. 74), or where, if at all, it would reach the Walla Walla river. No man can say it would or would not have become any part of the water available for use by any Washington irrigator. No testimony discloses what part of the water pumped returns to the ground water supply by deep percolation and becomes available to and is used by the Washington irrigators.

This water can not be said to be interstate water and, therefore, the objection of Oregon (Wash. Nar. Test. 257) that this court has no jurisdiction is well taken.

Washington has shown no present injury to her rights by the pumping from the wells in Oregon. She has shown no threatened injury to such rights, and has not shown anything to indicate to what limits the use of wells in Oregon must be confined in order to prevent injury to Washington. The court has no evidence before it upon which to act on Washington's prayer for injunction against the use of wells by Oregon.

It is elementary law that, before injunctive relief is granted, some injury, actual or threatened, must affirmatively be shown.

Both Oregon and Washington have followed "the American rule" with respect to percolating waters to the effect that the percolating waters (as distinguished from subterranean reservoirs, lakes, and streams) are part of the land and belong to the owner thereof, who

may capture and use them on his overlying land although such use may cut off his neighbor's underground supply or limit the supply of a surface stream, so long as his use is limited to a reasonable use upon the overlying lands.

*Boyce v. Cupper*, 37 Or. 256, 260, 61 P. 642.
*Hayes v. Adams*, 109 Or. 51, 57 and 58, 218 P. 933.
*Meyer v. Tacoma Light & Water Co.*, (Wash.), 35 P. 601.
*State v. American Fruit Growers*, (Wash.), 237 P. 498–500.
*Dickey v. Maddux*, (Wash.), 93 P. 1090–1091.

This rule is supported by decisions in a majority of the states.

*Hudson v. Dailey*, (Cal.), 105 P. 748–753.
*Roberts v. Gribble*, (Utah), 134 P. 1014.
*Bryan v. Quinlan*, (Mont.), 124 P. 512.
*Horne v. Utah Oil Refining Co.*, (Utah), 202 P. 815.
Farnham, Waters & Water Rights, Vol. 3, p. 2713, § 936.
Kinney, Irrigation & Water Rights, (2d Ed.), Vol. 2, p. 2164.

It must be observed that in the case at bar the undisputed evidence is:

> "* * * None of the irrigation wells furnish water for land other than that of the owner of the well. All of the pumping operations are for irrigating the overlying land owned by the well owners" (Or. Abs., Perry, p. 49).

In the case of *Snake Creek M. & T. Co. v. Midway Irr. Co.*, 260 U. S. 596, affirming 271 Fed. 157, it is held that, where a landowner develops underground water to an extent that it interferes with the flow of a stream and deprives prior irrigators of the use of that water, such landowner's sale of such water for use on distant lands is not a reasonable or beneficial use. This case adopts the American rule, as stated by the federal circuit court of appeals as follows:

> "(4) The rule generally adopted by, not only the courts of the arid states, but by most of the American courts, so that it may be said to be the American, as distinguished from the English rule, is that, while the owner of the land is entitled to appropriate subterranean or other waters accumulating on his land, which thereby become a part of the realty, he can not extract and appropriate them in excess of a reasonable and beneficial use upon the land he owns, unconnected with the beneficial use of the land, especially if the exercise of such use in excess of the reasonable and beneficial use is injurious to others, who have substantial rights to the water. * * *" Midway Irr. Co. et al. v. Snake Creek Mining & Tunnel Co., 271 Fed. 157 at 162 and 163.

The basis of decision in this case was that the attempted appropriation of the percolating waters by the mining company was not for use on overlying lands

but for conveyance and use upon distant lands, and for a use foreign to the business of the mining company, and such an appropriation of percolating waters interfered with long-established development. Such a use was not a reasonable and beneficial use upon the lands the mining company owned.

The language of the circuit court of appeals is direct authority for Oregon's contention in the case at bar that the owner of the overlying land has a right to the use of percolating water so long as his use is reasonable and beneficial, and confined to the overlying land, even though such use interferes with the supply of a surface stream.

In recent years there has been a tendency in some western states, led by California with the case of *Katz v. Walkinshaw*, 70 Pac. 663, 74 Pac. 766, to depart from the "American rule", and adopt what has come to be known as "correlative use". The history and development of this rule is discussed in 2 Wiel, Water Rights in the Western States, (3d Ed.), pages 970 et seq., who describes his conclusions on pages 1007 and 1008 with respect to the California rule, and is thoroughly discussed in the case of *Horne v. Utah Oil Refining Co.*, (Utah, 1921), 202 Pac. 815, 819 to 824. We think this rule with respect to percolating waters is to the effect that the owners of land overlying a stratum of water-bearing gravel or soil have the right to capture such percolating waters and apply them to use upon the overlying lands, this right being limited to a reasonable use, and, in case of shortage, the right being limited to the use of a supply proportionate to the acreage of overlying land owned by each; but the right of use on overlying land be-

ing superior to the right of conveying the water for use upon distant lands.

Oregon has never adopted this rule. Washington, in the case of *Patrick v. Smith*, 134 P. 1076–1079, has indicated their adherence to it:

> "* * * Although the new rule of percolating waters is firmly established in California, Washington is the only other western state in which it has been followed. * * *" Chandler, Elements of Western Water Law (Revised Ed.), p. 30.

The application of such a rule in this case, however, can not avail Washington or secure her any relief. It is pointed out in 2 Wiel, Water Rights in Western States, (3d Ed.), 1025 and 1026:

> "The result is that approaching percolations feeding a surface body of water and essential to its maintenance belong to the owners of that surface body, as in the case of the sub-flow, and can not be taken from them otherwise than in the reasonable use of one's own land where the underground water is thus taken.
>
> "In the reasonable use of one's own land any dimunition of the stream is *damnum absque injuria*. * * *"

Two cases which Washington fails to cite and which apparently tend more to support their theory than any of the others are *Los Angeles v. Pomeroy*, (Cal.), 57 Pac. 585, in which the California court held that the water in the San Fernando valley was sub-flow of the Los Angeles river, and the case of *City of Los Angeles v. Hunter*, 105 Pac. 755, in which the California court held that the San Fernando valley is the great natural reservoir and supply of the Los Angeles river. Neither

of these cases has any effect upon the case at bar, because the conditions upon which it was decided are not shown to exist in the present case.

In the case of *Maricopa County Etc. v. Southwestern Cotton Co.* (Ariz.), 4 Pac. (2d) 369, the Arizona supreme court distinguishes the California cases from one such as the case at bar. It was required to pass upon a state of facts a great deal like those in the instant case. The court thoroughly discussed the rules applying to percolating waters, and on page 378 of the opinion discusses the facts, saying:

> "Underlying substantially the entire valley at a depth of from a few feet to perhaps a hundred or more is found an immense quantity of subterranean water, which extends downward into the earth to a great distance. There is apparently a slow but steady movement of this entire quantity of water southwesterly until it presumably reaches and mingles with underground water of the Gila valley. So far as surface indications show, there are no underground channels of running water in the sense defined above, under, or near any of the land of plaintiff's except directly beneath the surface bed of the Agua Fria river. * * * Whenever, therefore, any of the rivers in question carries water enough to flow from the mountains, a great percentage of this water sinks into the more or less permeable material with which the valley is filled, and since it slopes in a more or less general direction toward the Gila valley, these waters gradually move in that direction. Since detritus with which the valley is filled is coarser in some places than in others, the tendency of the water is to accumulate in a greater quantity where the material is coarse than where it is fine, and to move more rapidly therein. * * *"

The court discusses the California cases upon the subject, and concludes, on page 381, that *Los Angeles v. Pomeroy*, supra, has no application because the water did not constitute the sub-flow of the river, since:

> "* * * There is not the slightest evidence that their pumping diminishes directly or appreciably the surface flow, no matter how true may be the converse."

and on pages 381 and 382 the court distinguishes the case of *Los Angeles v. Hunter*, supra, because the California court found the San Fernando valley to be a reservoir, and said:

> "* * * The waters of the San Fernando valley, therefore, are not percolating waters in the common sense of the term—vagrant, wandering drops moving by gravity in any and every direction along the line of least resistance."

The Arizona court then points out that, under facts closely parallel with those covering the underground water in the case at bar, the California cases can have no application, saying on page 382:

> "(25) But whether or not under the facts the San Fernando valley is indeed a lake, supplying the Los Angeles river, the evidence in this case shows conclusively one fact which negatives the theory that the water involved herein constitutes a lake of appropriable water under the law of Arizona. The surface of the water underlying plaintiffs' lands, and indeed under the entire valley, so far as it is known, instead of being perpendicular to a radius of the earth, as is invariably the case with a surface lake, has a decided slope or dip to the south and west. Whatever this water may be, it is not a 'lake' in the sense in which our statutes use the word.

> Whether it be diffused percolation in the common-law sense of the term, as defined in City of Los Angeles v. Hunter, supra, so that the extreme English doctrine applies thereto, or whether it be percolating waters whose extraction will tap other waters, and it therefore comes within the doctrine of correlative rights as developed in Katz v. Walkinshaw, and other cases which follow it, is immaterial in this instance, for neither class is subject to appropriation under the law of Arizona, which limits that right, so far as subterranean waters are concerned, to those similar to appropriable surface waters. Plaintiffs can claim no rights of appropriation to the waters pumped by them as a subflow of the Agua Fria river except such as comply with the test above laid down, to wit, that they are in the bed of the river, or so near thereto that the pumping from them will appreciably deplete the waters of the surface stream."

In the case at bar the testimony of Mr. Piper above referred to shows that in this case there is no underground reservoir; the waters are not the sub-flow of the river, since they are percolating radially away from it; that the ground water is apparently in the shape of a "hill of water", lending no support to the surface stream but sloping away therefrom, and the evidence shows that the waters are pumped for use only on overlying lands. It would necessarily follow that, so long as that use is reasonable, the state of Washington has suffered no actionable injury, and has shown no ground for interference in any way with Oregon's use of wells.

Under all rules governing the use of percolating waters, the old common-law or English rule, the American rule, the rule of reasonable use, and the rule of correlative use, the courts have at all times recognized

the right of the overlying land to make reasonable use of percolating waters by reason of their strategic location, and the fact that nature had given the lands the benefit of the flow and natural advantage of its use.

The case at bar must be distinguished from all cases involving the right to pump underground water for conveyance to, and use upon, distant lands. Oregon's use is entirely upon overlying land.

Whether the court applies in this case the "American rule" (acknowledged in both Oregon and Washington), or the rule of "correlative use" (to which Washington apparently subscribes in later years) the result is the same.

Washington, not having shown that Oregon's use on overlying lands is unreasonable, and not having shown that Oregon's use on overlying lands results in any real injury to the state of Washington, has failed to meet the heavy burden of proof under which she labors, and her alleged injury, if any, must be held to be "*damnum absque injuria*".

The record does not furnish a basis for regulation of, or interference with, Oregon's use of well water for irrigation on overlying lands.

### 5. Prescription and Adverse Use.

Oregon contends that having taken and beneficially used all of the water of the Walla Walla river in Oregon, necessary to irrigate its lands (even to the extent of drying up the stream each year after the subsiding of the spring floods), for a period of more than 50 years, and having done so openly, notoriously, adversely, hostilely, continuously, and under a claim of right; and, during the same time, Washington having

been deprived of the use of such water and having never asserted any claim of right thereto, or interrupted Oregon's use thereof, the citizens of Oregon so using the water have acquired vested rights thereto by adverse possession and prescription (Ans. pp. 8, 9, 18, 23, 24, and 26; see also Statement of Issues, Stipulation No. 10).

Washington contends that because of the maxim "*nullum tempus occurrit regi*", and because the state of Washington is complainant, there can be no title by adverse use and prescription (see Washington Brief, p. 77, and Brief on Motion to Strike, pp. 14 et seq.)

It has been directly held that the maxim has no application between states, and only applies to suits between subject and sovereign:

> "* * * Assuming that the holding of stock in the Louisville & Nashville Railroad Company by the city of Louisville is not merely a private property right, but is a public right, and is the exercise of governmental powers pertaining to sovereignty, the maxim, 'nullum tempus occurrit regi', is not applicable. This maxim is applied only to the sovereign or government that has enacted the limitation act. If foreign nations, subjects or citizens thereof, or municipalities deriving their power from a country other than that which has the act of limitation, seek the tribunals of the latter country, they are not entitled to apply this maxim, and will not be excepted from the limitation, unless the act of limitation excepts them in terms. The states of this Union, as between each other, or as between them and the United States, are not excepted from acts of limitation as to bringing suit, by the application of this maxim. * * *" Commissioner, etc. of Louisville v. Buckner, 48 Fed. 533–536.
>
> "* * * The earlier writers on international law have questioned how far that peculiar species of

presumption, arising from lapse of time, which is called prescription, is justly applicable as between nation and nation; but the constant and approved practice of nations shows that, by whatever name it be called, the uninterrupted possession of territory, or other property, for a certain length of time by one state, excludes the claim of every other, in the same manner as, by the law of nature and the municipal code of every civilized nation, a similar possession by an individual excludes the claim of every other person to the article of property in question. The rule is founded upon the supposition, confirmed by constant experience, that every person will naturally seek to enjoy that which belongs to him; and the inference fairly to be drawn from his silence and neglect of the original defect of his title, or his intention to relinquish it." Wheaton's International Law (6 Eng. Ed.) Vol. 1, p. 336.

Hall, International Law, 7th Edition, p. 120, says:

"* * * Title by prescription arises out of a long continued possession, where no original source of proprietary right can be shown to exist, or where possession in the first instance being wrongful, the legitimate proprietor has neglected to assert his right, or has been unable to do so."

See also:

Oppenheim's International Law (McNair) (4th Ed.) Vol. 1, pp. 467 to 471.

Hyde, International Law (1922) Vol. 1, pp. 192 to 196, Sec. 116.

59 C. J. 51.

Honnold, Supreme Court Law, Vol. 1, pp. 65 and 66, says:

"1. Right may be acquired on the one hand and lost on the other by open, long-continued and uninterrupted possession of land or territory.

"2. This doctrine is not confined to individuals, but applies to sovereign nations and states as well."

In the note to paragraph 2, p. 66, he says:

"* * * It is applicable to the quasi sovereign states of the Union. The rule, long settled and never doubted, is that long acquiscence by one state in the possession of territory by another and in the exercise of sovereignty and dominion over it is conclusive of the latter's title and rightful authority. State of Michigan v. State of Wisconsin, 270 U. S. 295, 46 S. Ct. 290, 70 L. Ed. 595; Indiana v. Kentucky, 136 U. S. 479, 509, 10 S. Ct. 1051, 34 L. Ed. 329 et seq.; Virginia v. Tennessee, 148 U. S. 503, 522, 13 S. Ct. 728, 37 L. Ed. 537; Louisiana v. Mississippi, 202 U. S. 1, 53, 26 S. Ct. 408, 50 L. Ed. 913; Maryland v. West Virginia, 217 U. S. 1, 40, 44, 30 S. Ct. 268, 54 L. Ed. 645; Rhode Island v. Massachusetts, 4 How. 591, 639, 11 L. Ed. 1116; Missouri v. Iowa, 7 How. 660, 677, 12 L. Ed. 861; New Mexico v. Colorado, 267 U. S. 30, 40, 41, 45 S. Ct. 202, 69 L. Ed. 499.

"The law of prescription applies to nations with the same effect as between individuals. Phillips v. Payne, 92 U. S. 130, 23 L. Ed. 649; Lawrence, Wheat. 303, 304; Vatt., b. 2, ch. 11, §§ 141, 147, 149."

This court holds:

"The effect to be given to such facts as long continued possession 'gradually ripening into that condition which is in conformity with international order', depends upon the merit of individual cases as they arise. 1 Oppenheim International Law, § 243.

In this case we think a right, in its nature prescriptive, has arisen, practically undisturbed for many years, not to be overthrown without doing violence to principles of established right and justice equally binding upon States and individuals. Rhode Island v. Massachusetts, 12 Pet. 657. * * *" Maryland v. West Virginia, 217 U. S., 1–42, 43 and 44.

Again in the case of *Rhode Island v. Massachusetts*, 14 Pet. 210–260, the court said:

"The possession of more than 100 years would become a rightful one by prescription, even if it had begun in wrong and injustice."

See also *Washington v. Oregon*, 214 U. S. 205–216, 217, where the court held title by prescription to have been acquired by Oregon as against the state of Washington.

The case of *Missouri v. Illinois*, 200 U. S. 496, 520, cited by Washington, is direct authority for the proposition that the rule which prevents a subject from acquiring a right by prescription as against his sovereign has no application to a state in a suit against another state.

If any individual irrigator in Washington sued an Oregon irrigator, in a state court or a federal district court, to determine their relative rights to the use of the waters of the Walla Walla river, the Oregon irrigator would unquestionably be entitled to avail himself of the defenses of limitation, adverse user, and prescription.

"It seems, however, that if a sovereign state enters the courts of a foreign state, it does so with no other rights and immunities than those which pertain to private corporations or individuals." 17 R. C. L. 971, § 344.

If the state of Washington had elected to sue the state of Oregon or any of its irrigators in the courts of the state of Oregon, the defense of limitation, adverse user, and prescription would be available.

It is not conceivable that either Oregon or its irrigators are deprived of these defenses because the state of Washington chose the supreme court of the United States as the forum.

In both Oregon and Washington rights to the use of water may be acquired by adverse use and prescription.

Section 1-202, Oregon Code 1930, and Remington's Revised Statutes of Washington, section 156, alike provide that no action shall be maintained for the recovery of real property unless it appears that the plaintiff, his ancestor, predecessor or grantor was seized or possessed of the premises in question within 10 years before the commencement of such action. Under these sections it is held that:

(1) Non-user of water rights by the owner, and adverse user by another, for a period equal to the limitation of actions for the recovery of real property, creates adverse title.

*Dodge v. Marsden*, 7 Or. 456.
*Weimer v. Simmons*, 27 Or. 1, 39 Pac. 6, 50 A. S. R. 685.
*Allen v. Roseburg*, 70 Wash. 422, 126 Pac. 900, 902.
*Madison v. McNeal* (Wash.), 19 P. (2d) 97.

(2) Adverse use of water rights is initiated when the owners are deprived of its use in such a substantial manner as to notify them that their rights are being invaded.

*North Powder Milling Co. v. Coughenour*, 34 Or. 9, 54 P. 223.
*McCoy v. Huntley*, 60 Or. 372, 119 P. 481.
*Watts v. Spencer*, 51 Or. 262, 94 P. 39.
*Davis v. Chamberlain*, 51 Or. 304, 98 P. 154.
*Hough v. Porter*, 51 Or. 318, 95 P. 732, 98 P. 1083, 102 P. 728.
*St. Martin v. Skamania Co.*, 79 Wash. 393, 140 P. 355.
*In re Ahtamun Creek*, 139 Wash. 84, 245 P. 758, 762.
*In re Alpowa Creek*, 129 Wash. 9, 224 P. 29, 129.
*Smith v. Nichanicky*, 123 Wash. 8, 211 Pac. 880.

(3) To constitute title by adverse possession, such possession must have been open, notorious, exclusive, hostile, and under a claim of right and continuous for the period of 10 years.

*Smith v. Nichanicky*, 123 Wash. 8, 211 P. 880.
*Berryman v. East Hoquiam Logging Co.*, 68 Wash. 657, 124 P. 130.
*Farwell v. Brisson*, 66 Wash. 305, 119 P. 814.
*Gardner v. Wright*, 49 Or. 609, 91 P. 286.
*Ebell v. Baker City*, 137 Or. 427, 299 P. 313.
*In re North Powder River*, 75 Or. 83, 146 P. 475.

(4) It is not necessary that the interference with the other appropriators' use be continuous throughout the year. A prescriptive right to the use of water during certain seasons of the year may be acquired, although during other seasons of the year there is ample water to supply all parties.

*Gardner v. Wright*, 49 Or. 609–629, 91 P. 286.
*In re North Powder River*, 75 Or. 83, 98 to 100, 146 P. 475.
*Bonifacich v. Cummings*, 111 Or. 555, 227 P. 469.
*Simpson v. Bankofier*, 141 Or. 426, 16 P. (2d) 632.
*Davis v. Chamberlain*, 51 Or. 304–314, 98 P. 154.
*In re Squillchuck Creek* (Wash.), 152 Wash. 443, 278 P. 147.

Where an individual water user in one state brings a suit against an individual water user of another state, rights acquired by adverse possession and prescription are recognized. In the case of *Morris v. Bean*, 146 Fed. 423, 433, the court discusses adverse possession of water, but holds that the facts in that case were not sufficient to establish the right. There was no discussion as to the laws of which state should apply.

In the case at bar the diversion occurred in Oregon, and the adverse use was in Oregon.

In the case of *Stillman v. Whiterock Manufacturing Company*, 3 Woodb. & M. 539, 23 Federal case No. 13,446, the complainants owned a dam and water power with adjacent land in Connecticut upon a river which is the dividing line from Rhode Island. The respondents

on the Rhode Island side owned land, a dam, and water power. The respondents diverted water to the injury of the complainant. The court held that the Statute of Limitations in Rhode Island applied and that the Statute of Limitations of Connecticut did not govern the case. In Connecticut adverse possession for 15 years gave title; in Rhode Island 20 years adverse possession was required. The respondent had shown adverse possession for 17 years and claimed title by reason of the Connecticut statute.

The court discusses the rights of the Connecticut user in and to the river and holds that the diversion being in Rhode Island the injury to the right occurred in Rhode Island, and that the Rhode Island courts and the United States district court had jurisdiction thereof, and the Rhode Island laws applied; therefore, the adverse possession being only for 17 years, the time for acquiring title in that manner had not yet expired under the Rhode Island laws. In discussing the case the court said:

> "If in a case like this, for instance, they (complainants) were willing to look on and see nearly half the water which they were entitled to have taken away entirely, and not remonstrate for 20 years, they ought to lose these rights for the public quiet, and the presumption should be, that they had conveyed the right or title as much as if without complaint they saw their field ploughed and reaped for 20 years by others."

The rights of the citizens of Oregon, therefore, acquired by adverse use must be determined by the laws of Oregon.

Complainant in its brief (p. 48) states that it is well-established law that the validity of a appropriation is

governed by the law of the state where the appropriation is made and cites authority therefor. In like manner the validity of title to water by adverse possession is governed by the law of the state wherein such adverse possession occurs, even though in the controversy both states may have the same rules of law governing the acquiring of such rights.

In Oregon title acquired by adverse possession for 10 years is as complete as though conveyed by deed from the owner (*Ebell v. City of Baker*, 137 Or. 427, 229 P. 313).

A glance at Washington's Exhibit 17 will show that any water reaching Washington for irrigation purposes must either come from the various spring branches arising generally in Sections 23 and 24 of Tp. 6 N., R. 35 East, or go down the main channel of the Tum-a-lum river, or through the channel which connects the Crocketts with the East Prong of the Little Walla Walla Spring branch, or that channel which connects the combined Ford and Crockett branches with the West Prong Little Walla Walla Spring branch.

It will also show that in the SW¼ NE¼ of Sec. 12, Tp. 5 N., R. 35 E., the Little Walla Walla and Tum-a-lum river divide. A bridge, known in the testimony as the "Red bridge" (Or. Ex. 45), is located at this point. The East Side Ditch Company's ditch takes out of the Tum-a-lum river in the NW¼ of the NW¼ of Sec. 1, Tp. 5 N., R. 35 E., and near this point is what is known in the testimony as the "Nursery bridge", and also a "Railroad bridge" (Or. Ex. 45). Just below these bridges the Hudson Bay Company's canal, which runs from the Tum-a-lum to the Little Walla Walla river, takes out of the Tum-a-lum and empties into the Little Walla Walla

above what is known as the "Frog" near the SE¼ of the NW¼ of Sec. 2, Tp. 5 N., R. 35 E. On the line between Secs. 24 and 25, Tp. 6 N., R. 35 E., is what is known as the "McCoy bridge" (Or. Ex. 45). It is at this point that springs arise in the channel of the river. Therefore, if the entire flow of the Walla Walla river is diverted at the Hudson Bay canal near the Nursery bridge no water flows down through that channel through Secs. 36 and 25 in Tp. 6 N., R. 35 E.

Every diverter in Oregon is an up-river diverter so far as the Washington users of water from the Walla Walla river are concerned, and the water they use is diverted from the stream and can not flow down to the Washington users.

Any diversion by an upper appropriator is adverse, if it limits the lower appropriator's use.

*Norwood v. Eastern Oregon Land Co.*, 112 Or. 106, 227 P. 111.
*Hough v. Porter*, 51 Or 318, 433, 95 P. 732, 98 P. 1083, 102 P. 728.
*Farwell v. Brisson*, 66 Wash. 305, 119 P. 814, 815.

The Peacock Milling Company diverts for water power from the Tum-a-lum river and discharges into the Little Walla Walla 56.25 c.f.s. with a priority of 1888, and 12.5 c.f.s. with a priority of 1898 (Oregon Decree, Wash. Ex. 1, proof No. 620, p. 207). This water does not again reach the Tum-a-lum river, and is all used ir irrigation and does not reach the Washington irrigators.

From the earliest days on, the water diverted for power by the Miller mill and the shingle mill was diverted from the main stream and discharged into the Little Walla Walla (Or. Abs., Forsythe, p. 27; Mason, p. 54).

Since before 1880 and to the present time, the irrigators in Oregon have diverted all water, except that required for the East Side Ditch Company, from the Tum-a-lum river into the Little Walla Walla river.

Whatever was permitted to flow down past the East Side diversion was taken by the Hudson Bay through their canal from the Tum-a-lum to the Little Walla river (Or. Abs., Burlingame, p. 22; Bowman, p. 24; Perry, p. 49; Spencer, p. 144).

Burlingame testified that Gardena had never had the use of any water from the Walla Walla river in Oregon during June, July, and August, excepting that which rose below the McCoy bridge (Or. Abs., p. 23).

Due to the nature of the stream bed the water would not flow to Gardena or Washington if turned down during the dry season (Or. Abs., Alta Rogers, pp. 33 and 34).

During the dry season when water has been permitted to flow down past the Hudson Bay headgate in the Tum-a-lum river, none of it has ever reached through to Gardena, and they have never had use of any water flowing down the Tum-a-lum during the dry season (Or. Abs., Burlingame, p. 23; Bowman, p. 24).

C. P. Hartvedt testified for Washington that by agreement in 1918 water was turned down the Tum-a-lum (Wash. Nar. Test., 64), and although he said that the water turned down reached Gardena the next day no hydrographic record could be produced to show

this, and he admitted he had no record showing any such increase (Wash. Nar. Test., pp. 66 to 68).

Dr. Woodburn testified that in 1932, Humphrey and himself turned down 20 c.f.s. which did not go through (Wash. Nar. Test., p. 144), and that in 1933 there flowed 19 c.f.s one day, 21 c.f.s. the next day, and 25 c.f.s. the third day, and the water had not gotten through (Wash. Nar. Test., p. 142). He did not know how much would be required to be turned down in order to get 22 c.f.s. through in July, but he said it would not be economical to attempt to get 22 c.f.s. feet of water down the Tum-a-lum (Wash. Nar. Test., p. 145).

Orrin Bowman testified that in 1928 they turned down 25 c.f.s. and after two days running it had not reached the McCoy bridge, but had disappeared; and that although flash boards were torn off their dams, either by persons or by logs coming down the stream, they had never remained out as much as two days (Or. Abs., pp. 24 and 25). Therefore, the water could not have gotten through.

The testimony and the hydrographic data show that Oregon has administered and used, during the dry season, all of the water flowing in the Walla Walla river, and permitted none to go down to the sink in the Tum-a-lum river. In effect, they are doing the same in Oregon as they do in Washington. Oregon is administering separately that part of the stream which is above the sink in the channel between the Nursery bridge and the McCoy bridge. Washington does the same thing with Mill creek by administering separately that part above the sink at Gose street (Wash. Nar. Test., pp. 37 and 40).

Washington's Exhibit 18, pp. 120 to 130, shows that the Hudson Bay ditch went dry before July 1 in all save

five of the years covered by the measurements, and that in some years carried so little water as to be practically dry before that date. In most years, for more than a month before it actually went dry, the ditch carried far less than 75 c.f.s. decreed to the company.

The testimony of Bowman is uncontradicted that at low-water time he sealed the Tum-a-lum dam tight and diverted all water from the Tum-a-lum into the Little Walla Walla river. It must therefore be apparent, in the absence of any contrary testimony, whatsoever, that when the Hudson Bay ditch was running very far below its allowance of 75 second-feet there was no water flowing between the Nursery bridge and the McCoy bridge.

Washington's Exhibit 27 (R. pp. 203 to 207) shows the dates in each year when Harlow Barney began to close off rights having later priority than 1892, for the purpose of supplying Gardena, as follows: June 1, 1929; June 10, 1930; May 26, 1931; June 27, 1932; July 9, 1933.

It is manifest that Oregon used all of the water in the Walla Walla river in Oregon, and turned the river dry each year regardless of Washington's needs. That the water was taken openly is shown by the testimony that so much was taken as to entirely dry up the stream.

It is also shown by the testimony of the various Washington users that from the time Washington began to administer its water rights according to priority their farms were so dried up that they had to entirely change their methods of farming and their crops. (Wash. Nar. Test., J. C. Hammer, p. 25; Cundiff and Hasting, pp. 46, 47; Walter Sams, p. 48; Ralph Danielson, p. 50; Carl Ross, pp. 27, 28; Royal Ross, pp. 31,

31, 32; Iver Williams, p. 33; Fred Dill, p. 44; Clifford C. Riggs, p. 52; Lee Smith, pp. 56, 59).

There is far more convincing proof that Washington was short of water for years to be found in Stipulation No. 5, Exhibit F (R. 44, 45), which shows that beginning with 1905 (the first year of any irrigation in Gardena proper) the company started to spend money on wells, and spent a total of $9,986.33, and in 1907 they spent $798 in attempting to secure reservoir sites, and beginning with 1910 they spent a total of $49,-255.92 to convey sewage water. The testimony of Mr. Burlingame confirms this (Or. Abs., p. 22).

Stipulation No. 5 (R. 29 to 37) shows that in 1917 Gardena had contracts for 3,721.36 acres. By their decree this amount would have entitled them to 37.21 c.f.s. from July 1 to August 1. Washington's Exhibit 18 (page 13) shows that beginning with July 19, and from then on, they were short.

Stipulation No. 5 shows contracts outstanding for 3,711.14 acres in 1918. By their decree from April 1 to July 1 they would have been entitled to 49.48 c.f.s. However, beginning June 17 they were cut down to 39.20 c.f.s. From July 1 to October 1 they would have been entitled to 37.11 c.f.s., but they never had that much.

Stipulation No. 5 shows contracts outstanding in 1919 for 4,186.12 acres which would have entitled them to 55.81 c.f.s. during the month of June. Washington's Exhibit 18, page 17, shows that from June 19 on they were short. From July 1 to October 1 they would have been entitled to 41.86 c.f.s., but Washington's Exhibit 18, page 18, shows that after July 1 they were short.

In 1922, Stipulation No. 5 shows contracts sold for 4,960.26 acres, which by decree would have allowed them 60.40 c.f.s. during the month of June. Exhibit 18, page 19, shows that after June 21, they were short of this amount. From July 1 to October 1 they would have been entitled to 35.30 c.f.s. Exhibit 18, page 19, shows that they were short, although they were receiving 3.08 c.f.s. of sewage.

Based upon the acreage contracted for in 1926 as shown by the stipulation, Gardena, under their decree, would have been entitled to 60.40 second-feet during the month of June. Washington's Exhibit 18, page 20, shows that during the month of June there was but one measurement taken, and they were short.

In 1927, Washington's Exhibit 18, page 20, shows Gardena to have on July 22 less than one-third of the water they were entitled to. The record does not show how long that shortage had existed.

In 1928, Washington's Exhibit 18, page 20, shows Gardena to have been short from June 16 on.

In 1929, Washington's Exhibit 18, page 20 shows Gardena to have been short from June 18 on.

In 1930, Washington's Exhibit 18, page 21, shows Gardena to have been short from June 22 on.

In 1931, Washington's Exhibit 18, page 21, shows Gardena to have been short from May 30 on.

In 1932, Washington's Exhibit 18, page 11, shows Gardena to have been short from July 9 on, and to have been short on June 28, 29, and 30.

In 1933, Washington's Exhibit 18, page 12, shows Gardena to have been short from July 14 on.

The citizens of Washington knew of the Oregon diversion. Riggs and others went into Oregon to in-

vestigate in April, 1930, and found the stream dry and all water diverted (Wash. Nar. Test., p. 52). Hartvedt went into Oregon to investigate in 1918 and also in 1930 and found all water then diverted (Wash. Nar. Test., pp. 64 and 67). Burlingame, a Washington citizen, and the builder of the Gardena system, about the year 1905, and often thereafter, went up the river "above the McCoy bridge clear up to the East Side ditch looking for hostile diversions—if someone was taking the water that belonged to us". The Tum-a-lum was dry (Or. Abs., 1, p. 21). Harlow Barney knew from 1920 on that the Oregon irrigators diverted all the water from the Tum-a-lum into the Little Walla Walla (Wash. Nar. Test., pp. 41 and 42):

The great development in Oregon with the attending commercial relations between the communities and the paved highways for inter-communication, all the result of Oregon's use of water, could not have escaped the notice of Washington.

In 1905 the Finis Irrigation Company case was started in the Oregon court. The decree is in evidence as Oregon's Exhibit No. 31, and adjudicates water rights of Oregon users, and awards a total quantity of water far in excess of the amount that would flow during the irrigation season. Here was an open assertion of a right in the highest court of the state of Oregon. The water masters began to administer under that decree as early as 1913, and have administered under it continuously ever since (Or. Abs., Roeder, p. 41; Perry, p. 46; Mason, p. 52; Spencer, p. 142; Oregon Ex. 32).

It is obvious that the administration of that decree during the irrigation season did use up all water

flowing in the stream for more than 21 years; therefore, Oregon has taken and used under claim of right openly, notoriously, hostilely, and continuously through the dry season of each year all of the water flowing in the stream. Testimony previously referred to shows this was done from 1880 on.

The Washington users, by such assertion of right and use of water on the part of Oregon, could not help but have been deprived of the use of the water, and when the water stopped flowing they could not help but know that Oregon was taking it. As a matter of fact, they were going up the river to ascertain what had become of the water.

From the time water masters went on (in 1913) all during the dry season each summer they, as officers of the state of Oregon, turned the water out of the Tum-a-lum and into the Little Walla Walla so that none went down to Washington (Or. Abs., Roeder, p. 43; Perry, pp. 47 and 49; Mason, pp. 54 and 55; Spencer, pp. 142 and 144). Thus we see that both the irrigators and the state itself have asserted and held the right to the use of this water.

Stipulation No. 3 affords some index as to what the Oregon people have done by the use of this water in paragraphs III, IV, and V. Obviously, this has been done in reliance upon the right to the use of this water since all of the development would be valueless if the water were taken away.

The record does not show that the state of Washington has ever at any time protested against this use of water or sought to prevent it, although a glance at the map is sufficient to show that this development could not have been made in Oregon without the knowledge

of the Washington people and officials. We know from the testimony of Burlingame, a Washington citizen and the man actually in charge of the development of the one project in the state of Washington (for the benefit of which this suit was brought), that he knew the water was short and felt the need of it. We have his testimony, and the evidence of exhibit "F" attached to Stipulation No. 5, that because of their shortage of water the Washington citizens as far back as 1905, were spending thousands of dollars to procure water from other sources.

There is no escaping the conclusion that the state of Washington felt Oregon's adverse use of this water. There is no escaping the conclusion that they knew of the great development going on in Oregon, and there is no escaping the conclusion that they remained quiet and made no effort to prevent development and investment in Oregon in reliance upon the use of this water.

## Estoppel.

As we have before pointed out, Stipulation No. 3 indicates a high development by intensive farming in Oregon. The admitted allegations of the Bill of Complaint establish that this development is dependent upon the use of water.

The map (Wash. Ex. 17) shows the close proximity of the Oregon irrigated lands to the city of Walla Walla. Stipulation No. 3 shows the development of that city with the attendant growth of industry and commerce. It is self-evident that some measure of this growth and prosperity is due to the intensive farming of the Oregon lands in the related area.

Clearly the Washington citizens had some knowledge of this growth and development, and, since they

so allege, they must have known it was dependent on irrigation.

We have referred to evidence showing that the use of water in Oregon for more than 50 years has been such as to dry up the stream during a part of each year. Washington must have known this.

We have hereinbefore referred to evidence showing that Washington citizens made trips of investigation in various years, coming into Oregon and inspecting the stream. The same evidence shows that the investigators found the water diverted in Oregon to an extent that the stream was dry.

Stipulation No. 5, as well as the evidence, discloses that, from 1892 on, Burlingame was closely connected with Gardena. He built the system and farmed and still farms land irrigated through the Gardena ditch.

The evidence shows (Or. Abs., pp. 21 to 25) that in 1911 Burlingame became interested in the Milton-Freewater & Hudson Bay Irrigation Company in Oregon and acquired control. He then owned one-half of the stock in the Walla Walla Irrigation Company (then the owner of the Gardena canal) and managed the canal, and later became the sole owner. He was then and is now a citizen of Walla Walla.

The evidence referred to in our argument on adverse use and prescription shows beyond question that the Hudson Bay ditch permitted no water to flow past its headgate on the Tum-a-lum at any time it needed water to supply those irrigating from its ditch.

Although, from 1892 on, he was constructing (when construction was carried on) and managed the Gardena canal until the year 1928, when the Gardena Farms

District was formed (Stipulation No. 5), and although he was the first irrigator from the Gardena ditch (Or. Abs., p. 19), and still irrigates from that ditch, Burlingame always recognized and treated the right of the Hudson Bay Company as superior to that of Gardena and, while in control of the Hudson Bay, continued to so divert the water into that ditch as to completely dry up the Tum-a-lum each year.

He did this at the time he was directing the Walla Walla Irrigation Company's expenditure of large sums of money to secure water from other sources (wells and sewage), to supply the needs of Gardena, and even after these efforts to secure other water had failed.

We have in this brief referred to testimony showing that Washington irrigators were so short of water as to be compelled to change their crops and that in Gardena the shortage was such that only the perishable crops could be irrigated and the main crops were without water during the dry season.

Under these circumstances, it is interesting to note that the state of Washington and its citizens made no protest against Oregon's diversion and use of water, made no demand for any change therein, or for Oregon to permit additional water to flow down to Washington until 1930, when the demand was made by Harlow Barney (Wash. Nar. Test., p. 39; Or. Abs., Perry, p. 49), and the telegrams (Wash. Ex. 24, 25 and 26) were interchanged as the basis for this suit.

Washington's conduct can be taken as nothing other than acquiescence in Oregon's diversion and use, and a recognition that Oregon's use was rightful.

Relying upon this long acquiescence in and recognition of Oregon's rights by the state of Washington and

its citizens, the water users of Oregon were induced to believe and did believe that their rights were secure, and were led to and did make large expenditures of money and labor in developing their farms and communities and building their homes and public improvements as shown by Stipulation No. 3 (Or. Abs., pp. 6 to 9, inclusive).

Oregon and its citizens will be irreparably damaged if Washington is now permitted to change its position. Under the circumstances, if Washington or its citizens claimed any rights as against Oregon it was their duty to speak.

> "Again, where the evidence is conclusive that the owner, knowing that his rights were about to be invaded by another, stood by and permitted the other parties to construct expensive works, use, and enjoy the rights, and by his actions assented and invited such works and use, although he did not do so in terms, but by his very silence, he induces them to believe that such rights might be acquired, that thereafterward to deprive them of such rights would work an injustice and fraud upon them, such owner will be held to be estopped from setting up or claiming such rights. * * *" 2 Kinney on Irrigation & Water Rights, (2d Ed.), § 1127, at page 2040.

The complainant seeks injunctive relief. The rule as to estoppel in such cases is well stated in *Katz v. Walkinshaw*, 74 Pac. 766 at 772, as follows:

> "* * * Where the complainant has stood by while the development was made for public use, and has suffered it to proceed at large expense to successful operation, having reasonable cause to believe it would affect his own water supply, the injunction should be refused, and the party left to his action for such damages as he can prove."

See also *Barton v. Riverside Water Co.*, (Cal.) 101 Pac. 790 at 792, and *Crescent Canal Co. v. Montgomery*, 76 Pac. 1082 at 1084.

**Separate Administration in Oregon.**

Testimony heretofore recounted shows that the Tum-a-lum, or the main stream of the Walla Walla river in Oregon, was turned dry each year by the diversion of the water into the Little Walla Walla at the Red bridge, and the further diversions of the East Side ditch and the Hudson Bay ditch. The diversion into the Little Walla Walla from the main stream was practiced at the time the oldest witness (William Forsythe, who came to the country in 1879) knew anything about the stream (Or. Abs., pp. 25, 26 and 27), and has been continued up to the present time. Such practice has changed the character of the main stream and has made the Little Walla Walla into the main stream.

Whether considered under the Statute of Limitations, adverse use, laches, or estoppel, the courts of both Washington and Oregon have held that such diversion changes the main channel and thereby modifies the lower water users' rights and prevents the acquisition by a lower apropriator of rights on the main stream.

In *Harrington v. Demaris*, 46 Or. 111 (76 Pac. 603, 82 Pac. 14), at page 119 of the Oregon Reports, the court approves the case of *Burk v. Simonson*, 104 Ind. 178, and says:

"Where a change is made in the flow of a natural water course either artificially or otherwise, and riparian owners acquiesce in the new state of the

stream for so long a time that new rights accrue or may be presumed to have accrued, such acquiescence is binding and precludes a restoration of the stream and its surroundings to their original condition."

This holding is approved in the case of *Hough v. Porter*, 51 Or. 318 at page 415 (95 Pac. 732, 98 Pac. 1083), where the court says:

"The opening of these channels was acquiesced in by all on the stream, and since the year 1882 the water has naturally run through them in about the proportion indicated. Having flowed in this manner for more than the period prescribed by the statute of limitation they have become fixed."

The same principle is recognized by the state of Washington, in the case of *Matheson v. Ward*, 24 Wash. 407, 64 Pac. 520. The Dungeness river divided into three branches. The east branch is known as Hurd creek channel, the central branch as the East channel, and the one further west as the West channel. It was admitted that from 1865 down to 1895 no water flowed in the West channel excepting seepage and at extreme high water. In 1895 an excavation was made by persons living on the creek so that at the time of the trial the principal flow was in the West channel. The court, at page 521 of the Pacific Reporter, says:

"* * * Even if the West channel was a natural channel prior to 1865, and was then dammed up, and the water diverted to the East and Hurd's creek channels, where it was confined for 30 years, and this flow was acquiesced in by the riparian owners and others along the channels of said river, this would make the East and Hurd's creek the natural channels; and defendants and others purchasing and improving lands along the old channel, and

relying upon the flow continuing in the channels thereby formed, could not now have their lands damaged by reason of the water being turned back by artificial means after that lapse of time. After the lapse of 30 years the channels known as the 'East' and 'Hurd's creek' became natural channels, and the attempt of riparian or other owners to change the flow at this late day to the injury of persons on the old channel would be unlawful. According to the evidence it is probably true that in the year 1865 one Le Balister, by means of a dam or embankment, changed the flow of water out of the West channel. Conceding it to be so, the acquiescence by plaintiffs and their grantors and all riparian owners below the point of divergence for a period of 30 years has now lost them the right to change the flow from the new into the old channel. 28 Am. and Eng. Enc. Law, p. 964; Woodbury v. Short, 17 Vt. 387, 44 Am. Dec. 344; Ford v. White, 27 Vt. 265; Ang. Water Courses, § 108h. Gould, Water, § 159, says: 'When a stream flowing through a person's land is diverted into a new channel, either artificially or by sudden flood, affecting the rights of other riparian proprietors favorably, and the owner acquiesces in the new state of the stream for so long a time that new rights accrue, or may be presumed to have accrued, such acquiescence is binding, like a public dedication, and the stream can not be lawfully returned to its former channel.' No doubt the plaintiffs, within a reasonable time after such diversion, could have removed the obstruction placed across the West channel by Le Balister; but when, after 30 years, they undertook to do so by virtually making a new channel, they were invading the rights of those below, who had purchased lands and improved the same. * * *"

In the case at bar the acquiescence by the state of Washington and its citizens in the diversion of the Tum-a-lum or the main Walla Walla river in Oregon

into the Little Walla Walla river for a period of more than 50 years has now lost them the right to change the flow from the new into the old channel.

Testimony heretofore enumerated shows that none of the water so diverted into the Little Walla Walla river has ever reached the state of Washington during the irrigation season in any year. No rights have been acquired upon the new stream by the state of Washington, or any of its citizens. So far, therefore, as separate administration of water in Oregon or the rights of Washington and its citizens are concerned these principles of law apply with full force and effect. The courts at all times give weight to time and long usage, sometimes under the doctrine of adverse use, at other times under the doctrine of laches and acquiescence, and at still other times it is given effect by the expression that it would be inequitable not to regard it. Adverse use, prescription, estoppel, and lapse of time apply not only to individuals but to states and governments as well.

"* * * (8, 9.) But the great weight of authority, the stronger reasons and the settled rule upon this subject in the courts of the United States, is that, while mere delay does not, either by limitation or laches, or itself constitute a bar to suits and claims of a state or of the United States, yet, when a sovereignty submits itself to the jurisdiction of a court of equity and prays its aid, its claims and rights are judicable by every other principle and rule of equity applicable to the claims and rights of private parties under similar circumstances.

"(10). The equitable claims of a state or of the United States appeal to the conscience of a chancellor with the same, but with no greater or less force than would those of an individual under like cir-

cumstances. (Citing many cases.)" State of Iowa v. Carr, 191 Fed. 257–266 (cited by Washington).

"Resolute good faith should characterize the conduct of states in their dealings with individuals, and there is no reason, in morals or law that will exempt them from the doctrine of estoppel. * * *" State of Indiana v. Milk, et al., 11 Fed. 389–397.

"We think that, upon the principles stated in Missouri v. Illinois, 200 U. S. 496, 520, et seq. 50 L. Ed. 572, 578, 26 Sup. Ct. Rep. 268, the claims of the complainants should not be pressed to a logical extreme without regard to relative suffering and the time during which the complainants have let the defendants go on without complaint."

Wisconsin v. Illinois, 281 U. S. 179, 200; 74 L. Ed. 799, 805.

"Equality of right" forbids that Washington, after 50 years of silence and recognition of Oregon's rights, should now be permitted, by a claim never before asserted, to cause Oregon and its irrigators the irreparable loss and damage that would result from depriving them of the use of the waters of the Walla Walla river in Oregon.

## CONCLUSION.

We respectfully submit that complainant has failed to meet the heavy burden of proof imposed upon one sovereign state seeking relief against another, and has brought forward no adequate reason for disturbing the Master's Findings in any particular.

Under the authority of *Connecticut v. Massachusetts*, 282 U. S. 660, 669, 75 L. Ed. 603, 607, the Master's Findings should be adopted and the bill dismissed.

Respectfully submitted,

I. H. VAN WINKLE,
Attorney-General for
the State of Oregon,

JAS. A. FEE,
COLON R. EBERHARD,
GEO. T. COCHRAN,
C. Z. RANDALL,
Special Counsel for the
State of Oregon,

*Solicitors for defendant State of Oregon.*

IN THE

# Supreme Court of the United States

IN EQUITY

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No. 11, ORIGINAL

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OCTOBER TERM, 1935

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THE STATE OF WASHINGTON, COMPLAINANT,

*v.*

THE STATE OF OREGON, DEFENDANT.

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## PROOF OF MAILING DEFENDANT'S BRIEF UPON COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER.

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STATE OF OREGON,
County of Marion } ss.

The undersigned being first duly sworn on oath deposes and says that on the ..... day of January, 1936, at Salem, Oregon, he deposited in the United States Post Office in sealed envelopes—one addressed to "Mr. G. W. Hamilton, Attorney General, Olympia, Washington", one addressed to "Mr. Fred J. Cunningham, Attorney at Law, Old National Bank Building, Spokane, Washington", counsel for the State of Washington—true copies of the foregoing Defendant's Brief

upon Complainant's Exceptions to the Report of the Special Master in the above entitled cause.

.....,

Subscribed and sworn to before me this ..... day of January, 1936.

.....,
Notary Public for Oregon.

My commission expires .....

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# SUPREME COURT OF THE UNITED STATES.

No. 11, Original.—October Term, 1935.

The State of Washington, Complainant,
*vs.*
The State of Oregon, Defendant.

[March 2, 1936.]

Mr. Justice Cardozo delivered the opinion of the Court.

With leave of court (283 U. S. 801), the State of Washington filed a bill of complaint on July 22, 1931, in which it charged that the State of Oregon was wrongfully diverting the waters of the Walla Walla River to the prejudice of inhabitants of Washington, and prayed an adjudication apportioning the interests of the two states in the river and in tributary streams and restraining any use or diversion of the waters found to be unlawful. To this complaint Oregon filed an answer containing denials and defenses, to which Washington replied. On February 20, 1933, this court appointed a Special Master with authority to take evidence and with directions to make findings of fact and conclusions of law to be submitted to the court with recommendations for a decree. 288 U. S. 592. The case is now here upon exceptions filed by Washington to the Master's report, which finds the facts fully and advises the dismissal of the bill.

The Walla Walla River, a non-navigable stream, rises in the Blue Mountains of northeastern Oregon. For about four miles above the City of Milton it flows through a narrow canyon, the waters for that reach being inaccessible for purposes of irrigation. At Milton the river broadens out in a delta formation. The first division in this formation is at Red Bridge, near the city, where the river breaks into two branches. One, the Tum-a-lum, as it is known in Oregon, or the main Walla Walla, as it is known in Washington, flows through cobble rocks over great depths of gravel till it reaches the McCoy Bridge. There, at the margin of an alluvial fan, springs rise from below the surface, and feed the flow anew. Thus reinforced, the stream moves northwesterly to the line between the two states, and again northwesterly for about thirty miles in Washington to its confluence with the Columbia River. A second branch

of the river, starting at the Red Bridge, is known as the Little Walla Walla, which divides after a mile into the Crocket and the Ford. Prongs of the Crocket which contribute little, if any, water during the irrigation season, combine with another stream after crossing the state line, and discharge into the main river above the intake of the canal of the Gardena project. Another prong of the Crocket comes together with the Ford and joins the main river in Washington below the intake of the canal. Still another tributary, known as the Mill Creek, rises in the Blue Mountains, and flows far to the east of the courses just described. After breaking up into other creeks (the Yellowhawk, the Garrison and others), it joins the main stream of the Walla Walla within the state of Washington. No claim is made by the complainant that the waters of Mill Creek have been illegally diverted. Indeed, the fact appears to be that the inhabitants of Washington use the waters of that creek to the exclusion of any use thereof by the inhabitants of Oregon. The claim of wrongdoing has its centre in the use of the waters of the Walla Walla arising above the Red Bridge.

The Walla Walla Basin has a semi-arid climate with warm dry summers and cold wet winters. The streams contributing to the river are supplied in the main from the snows of the Blue Mountains. Upon the coming of spring, these snows are melted, and the river at that season attains its highest flow. Even then there are variations, not only from month to month, but from day to day. With the advance of summer, the flow diminishes greatly, particularly in the latter part of July and August. In such a climate agriculture cannot go on successfully without the aid of irrigation. A sporadic supply of water will not meet the farmer's needs. "To be available in a practical sense the supply must be fairly continuous and dependable." *Wyoming* v. *Colorado*, 259 U. S. 419, 471. A fair division of the water is thus vital to the prosperity of this agricultural community, and even to its life, for agricultural in the main it is. True, there are cities also within the limits of the watershed, Walla Walla in Washington with a population of 15,976; Milton and Freewater in Oregon with a combined population of 2,308. Even so, the welfare of the cities is closely bound up with that of the area about them. Indeed, there has been a unity of growth in the development of the whole community, a development quite independent of the dividing line between the states. As already pointed out, farmers in Washington have had the benefit of Mill Creek, which takes its rise in Oregon.

Complainant and defendant have stipulated that for the purposes of this case the individual rights of the respective land owners and water owners concerned in both states are governed by the doctrine of prior appropriation. *Wyoming* v. *Colorado, supra.* The Washington court made a decree in September, 1928, adjudging the priorities of appropriators in Washington. The Oregon court made one in August, 1912, adjudging the priorities of appropriators in Oregon. Neither state was a party to the judicial proceedings in the other. The stream supply has been sufficient through the aid of the Mill Creek to satisfy rights with priorities up to 1891 under each of the decrees. What Washington complains of chiefly is the deficiency in the supply available for the satisfaction of alleged priorities up to 1892. Particularly it complains of the deficiency of the supply for the Gardena Farms District. By the decree of September, 1928, the District was adjudged the holder of a water right with an 1892 priority for the irrigation of 7,000 acres upon specified conditions. This priority, though recognized in Washington, is contested by Oregon. The project affected by that award was started in 1892 by the Walla Walla Irrigation Company. A canal to connect with the Walla Walla River was to carry water for irrigation to a tract known as the Gardena District, twelve miles or more away. Work on the canal was slow and intermittent, chiefly for lack of funds. About 1903 the engineers discovered that the best land in the District could not be irrigated at all unless the plans were greatly changed. Thereupon a new system of construction was adopted following a different route. Not till 1904 or later was water in the canal applied beneficially to any acreage in Washington except in trifling quantities. Long before that time, beginning in 1880 or earlier and continuously thereafter, irrigators in Oregon had been appropriating to themselves the waters of the river above the Red Bridge.

We turn at this point to a consideration of the acts of appropriation, their nature and effect, in an endeavor to ascertain whether they were legitimate or wrongful. For more than fifty years before the filing of this suit irrigators in Oregon at seasons of shortage maintained crude or temporary dams across the Walla Walla River close to the Red Bridge. During the low water period the effect of the dam was to turn the waters of the river away from the channel of the Tum-a-lum into the channel of the Little Walla Walla, where they were used for agricultural, domestic and kindred

purposes. A small quantity of water necessary to supply the right of the East Side Ditch has been permitted to go by the dam without interference. With that exception, which is negligible, all the waters have been diverted without interruption and without protest for more than fifty years. Was this a wrong to Washington?

"Before this court can be moved to exercise its extraordinary power under the Constitution to control the conduct of one State at the suit of another, the threatened invasion of rights must be of serious magnitude and it must be established by clear and convincing evidence." *New York* v. *New Jersey*, 256 U. S. 296, 309; *North Dakota* v. *Minnesota*, 263 U. S. 365, 374; *Connecticut* v. *Massachusetts*, 282 U. S. 660, 669; *Missouri* v. *Illinois*, 200 U. S. 496, 521. The Master has found: "There is no satisfactory proof that to turn down water past the Red Bridge in Oregon during the period of water shortage would be materially more advantageous to Washington users than to permit such water to be applied to surface irrigation in Oregon." This is so because of the nature of the channel of the Tum-a-lum River. During the period of water shortage, only a small quantity of water would go by if the dams should be removed. There is evidence that this quantity, small at the beginning, would be quickly absorbed and lost in the deep gravel beneath the channel. Experiments have proved that it would not reach the McCoy Bridge, only a few miles down the stream. As to this the Master finds: "The channel of the Tum-a-lum River between the Nursery Bridge [which is close to the Red Bridge] and the McCoy Bridge [farther down] is an extremely wasteful channel. Water turned past the Red Bridge sinks and becomes part of the underground waters." "To limit the long established use in Oregon would materially injure Oregon users without a compensating benefit to Washington users." These findings are well supported by the evidence. Complainant has brought forward no adequate reason for disturbing them. *Connecticut* v. *Massachusetts, supra*, at p. 669. Accepting them, as we do, we accept also the conclusion to which they point with inescapable directness. To restrain the diversion at the bridge would bring distress and even ruin to a long established settlement of tillers of the soil for no other or better purpose than to vindicate a barren right. This is not the high equity that moves the conscience of the court in giving judgment between states. *North Dakota* v. *Minnesota, supra;*

*Connecticut* v. *Massachusetts, supra; Kansas* v. *Colorado,* 206 U. S. 46, 109. Far from being that, it is rather "the *summum jus* of power". *Mutual Life Insurance Co.* v. *Johnson,* 293 U. S. 335, 339. In default of reasons for removal more urgent and compelling, the tillers of the soil will be left where they have settled. Cf. *Hough* v. *Porter,* 51 Oregon 318, 415 ; *Matheson* v. *Ward,* 24 Wash. 407, 411.

The question must still be met whether the waters when diverted are misapplied or wasted with ensuing loss to the complainant. As to this the findings are explicit, and they are supported by the evidence. "The use of water by the irrigators within the State of Oregon is not unduly wasteful but is, under the circumstances, a reasonable, beneficial and necessary use." Nor does the evidence sustain the allegation of the bill that through the diversion of the stream and the application of the water to new irrigated lands the underground water supply has been so shifted to the west that it does not return to the river at such a point as to be usable by the inhabitants of Washington. As to this and other charges of damage or wrongdoing, the burden of proof falls heavily on complainant, more heavily, we have held, than in a suit for an injunction where states are not involved. *North Dakota* v. *Minnesota, supra; Connecticut* v. *Massachusetts, supra.* The burden has not been borne. On the contrary, the Master finds on the basis of supporting evidence that "a substantial part of the water applied to irrigation in Oregon . . . goes into the underground water supply", and returns to the river. Indeed, he goes farther and concludes that "the use of water for irrigation within the State of Oregon is beneficial to irrigators within the State of Washington", by feeding the many springs that supply the main river later in its course. Whether this is so or not, certain at least it is that the injury, if there is any, does not appear "by clear and convincing evidence" to be one "of serious magnitude". *Connecticut* v. *Massachusetts, supra; New York* v. *New Jersey, supra.* Between the high contending parties whose interests are involved, nothing less will set in motion the restraining power of the court.

Next to be considered is the practice of the defendant's farmers in sinking wells upon their farms. This is stated in the findings. "In addition to the surface water available for use within the State of Oregon, the farmers have tapped the subsurface water supply by sinking about three hundred wells, from which wells they

pump each year approximately 9,000 acre feet of water. The water so pumped is used upon the lands where the several wells are located." A different question would be here if the water when extracted had been sold or otherwise employed for use on distant lands. Such use is unlawful according to the rule in many courts (*Snake Creek Mining & Tunnel Co.* v. *Midway Irrigation Co.*, 260 U. S. 596, aff'g 271 Fed. 157; *Forbell* v. *City of New York*, 164 N. Y. 522; *People* v. *New York Carbonic Acid Gas Co.*, 196 N. Y. 421; *Bassett* v. *Salisbury Mfg. Co.*, 43 N. H. 569; *Patrick* v. *Smith*, 75 Wash. 407), though the decisions are not uniform. *Acton* v. *Blundell*, 12 M. & W. 324.[1] Again, a different question would be here if the waters, though subterranean, followed a defined channel, instead of percolating vagrantly through rocks and sand and gravel. *Snake Creek Mining & Terminal Co.* v. *Midway Irrigation Co.*, *supra*; *Boyce* v. *Cupper*, 37 Oregon, 256, 260; *Hayes* v. *Adams*, 109 Oregon 51, 57, 58; *Meyer* v. *Tacoma Light & Water Co.*, 8 Wash. 144; *Horne* v. *Utah Oil Refining Co.*, 59 Utah 279; *Clinchfield Coal Corporation* v. *Compton*, 148 Va. 437. Here the water level is on such a slope that, without any pumping, gravity would take the water away from the channel of any stream, either above the surface or below it. In such circumstances the right to pump in reasonable quantities for the beneficial enjoyment of the overlying land is allowed even by those courts that have placed the narrowest restrictions on the use of percolating waters. *Maricopa County District* v. *Southwest Cotton Co.*, 39 Ariz. 65, 86, 90, 97, 100; *City of Los Angeles* v. *Pomeroy*, 124 Cal. 597; *McClintock* v. *Hudson*, 141 Cal. 275; *City of Los Angeles* v. *Hunter*, 156 Cal. 603.[2] Cf. *Ide* v. *United States*, 263 U. S. 497, 506. In saying this we do not intimate, either one way or the other, that our conclusion would be different if the geological formation were other than it is. To all this we add that once more as at other stages of the case complainant has been unsuccessful in supplying evidence of damage. As to that the Master finds: "There is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington." If any wrong has been done, it is unsubstantial and uncertain.

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[1] For a full collection of the cases see 55 A. L. R. 1390.

[2] Many cases are collected in Kinney, Irrigation and Water Rights, 2d ed., vol. 2, pp. 2162-2167; Wiel, Water Rights in the Western States, 3rd ed., vol. 2, §§ 1042 *et seq.*

What has been said avails without more to repel the claim of the complainant that by the dams at the Red Bridge or by the use of wells or pumps, the Oregon irrigators are wrongfully diverting or depleting the waters of the river to the prejudice of irrigators resident in Washington. To repel this claim of wrong, however, does not dispose of the whole case. The question remains whether the Oregon irrigators as a result of all their acts are taking to themselves more than their equitable proportion of the waters of the river, priority of appropriation being the basis of division. As to this too the Master has reported in their favor. For the understanding of his ruling and its satisfactory appraisal there is need to recur briefly to the claim of the Gardena Farms.

Washington does not challenge the priorities adjudged in the Oregon decree. Oregon does not challenge those adjudged in the Washington decree, except only the priority alloted to the Gardena Farms. If that priority is excluded, the Oregon irrigators have not exceeded their equitable quota, at all events in any measure so substantial as to call for an injunction in a contest between states. A notice posted in 1892 fixed the locus of the intake of the canal for the Gardena project. This intake was far above the point where the branches of the Little Walla Walla unite with the main stream, if we except a few prongs of insignificant extent. The projectors of the canal were thus informed from the beginning that none of the waters of the Tum-a-lum above the Red Bridge would be available for the canal during the season of summer irrigation as long as the Oregon farmers were permitted to maintain the dams that diverted the waters of the Tum-a-lum into the Little Walla Walla. The physical conditions were notorious and were known to the canal company and, in particular, to its president, the leader of the enterprise. What was done or omitted in keeping the appropriation alive against the Oregon farmers in the vicinity of Milton must be read and interpreted in the light of that knowledge and its resulting obligations.

A priority once acquired or put in course of acquisition by the posting of a notice may be lost to the claimant by abandonment or laches. There must be no waste in arid lands of the "treasure" of a river. *New York* v. *New Jersey*, 283 U. S. 336, 342. The essence of the doctrine of prior appropriation is beneficial use, not a stale or barren claim. Only diligence and good faith will keep the privilege alive. *Seaweard* v. *Pacific Livestock Co.*, 49

Oregon 157, 161; *Re Rights of Waters of Silvies River,* 115 Oregon 27, 61; *Re Water Rights of Hood River,* 114 Oregon 112, 131; *State ex rel. Ham* v. *Supreme Court,* 70 Wash. 442, 463.[3] When these are shown to be lacking, the water right will fail, or fail to the extent that equity requires. Such according to the Master has been the fate of the Gardena filing. True a court in Washington determined in 1928 that the priority was to be recognized as of 1892. The decree was of no force against Oregon or Oregon appropriators not parties to the suit. *United States* v. *Oregon,* 295 U. S. 1, 12; *Priest* v. *Las Vegas,* 232 U. S. 604. As to them priority had lapsed, if the claimant had forfeited it by inequitable conduct. The label of the acts is unimportant, whether laches or estoppel or abandonment. What matters is their quality. Persistence in such conduct may extinguish the equitable right. It may bar an equitable remedy. Irrigators in another state, unaffected by the decree, are at liberty to show the facts, and upon the basis of that showing to fix their user of the stream.

Laches and abandonment, chargeable to the Gardena users, are found in the report. Not till 1930 was there a claim in their behalf to the beneficial use of the waters of the river arising above the bridge. Not till then was such a claim advanced by Washington itself or by any of its residents. Without a sign of challenge the Oregon users were allowed to develop their little settlement in the faith that their enjoyment of the waters was uncontested by any one. During these many years of growth Gardena Farms in particular evinced by many acts its recognition and acceptance of the existing situation. These acts are narrated carefully in the findings of the Master. There is no need to repeat them here. Viewing them collectively he concludes that the Gardena Farms District has never put the waters of the river arising above Red Bridge to a beneficial use during the irrigation season; that the intention to apply them to such a use was abandoned, if it ever existed, before the commencement of this suit; and that for a period of nearly forty years there has been recognition of the superior right of the Oregon appropriators. Here surely is not the diligence that equity exacts of the suitor who invokes its distinctive jurisdiction.

[3] See Kinney, Irrigation and Water Rights, 2d ed., vol. 2, pp. 1978, 1988, 2004, and Wiel, Water Rights in the Western States, 3rd ed., vol. 1, §§ 371, 567 *et seq.*, collecting the decisions.

We have dwelt upon the question of abandonment, for it has been much considered in the report and in the arguments of counsel. In so doing we have not meant to hold that in the absence of abandonment there would be an inequitable apportionment calling for relief by injunction, unless indeed the flow of the stream should unexpectedly increase. We are to bear in mind steadily that the controversy is between states, and not between private litigants, the burden and quantum of the proof being governed accordingly. *North Dakota* v. *Minnesota, supra.* At present there would be no benefit to Gardena, or none that has been proved, if the waters of the Tum-a-lum were not obstructed by the dam. In all likelihood they would be lost in the deep gravel of the channel and would not reappear beyond until the shortage season had gone by. So also, there would be no benefit, or none that has been proved, if the use of the Little Walla Walla were less than it has been. The chief points of junction with the main river are below the intake of the canal where Gardena is privileged to tap the waters of the stream. No evidence brought to our notice by either of the parties carries with it a suggestion that other Oregon priorities would be cut down or displaced if the Gardena priority were established to the full. We need not go into the question more fully at this time.

The case comes down to this: the court is asked upon uncertain evidence of prior right and still more uncertain evidence of damage to destroy possessory interests enjoyed without challenge for over half a century. In such circumstances an injunction would not issue if the contest were between private parties, at odds about a boundary. Still less will it issue here in a contest between states, a contest to be dealt with in the large and ample way that alone becomes the dignity of the litigants concerned.

A decree will be entered confirming the report of the Master, and dismissing the complaint upon the merits, the costs and expenses of the suit to be divided between the parties in accordance with the usual practice. *Michigan* v. *Wisconsin*, 270 U. S. 295, 319, 320; *North Dakota* v. *Minnesota*, 263 U. S. 583.

*It is so ordered.*

A true copy.

Test:

*Clerk, Supreme Court, U. S.*